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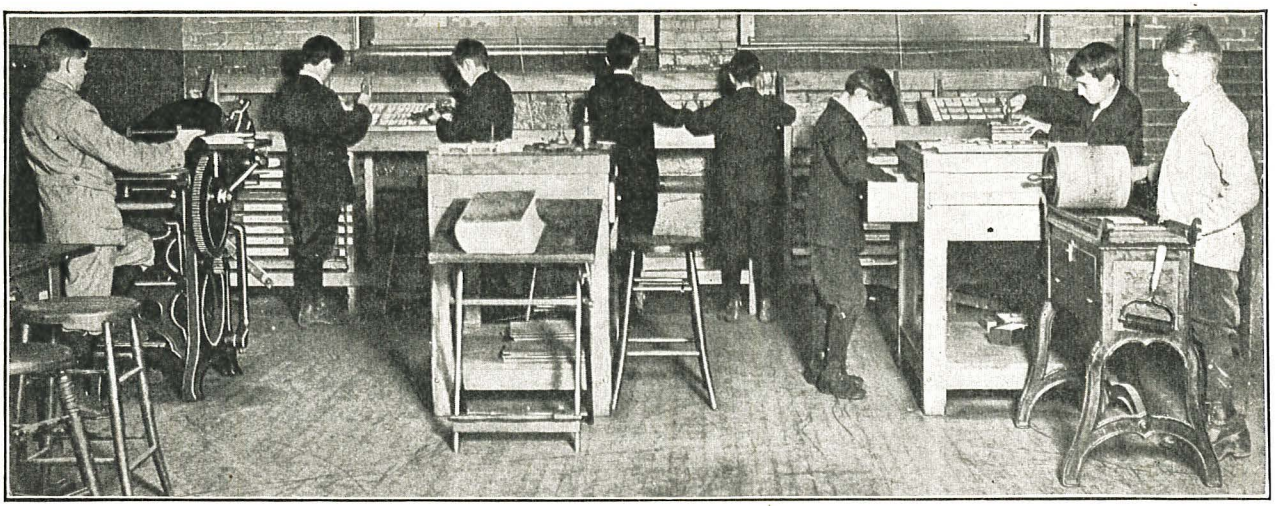


Partial view of Printing Dept.—State Normal School, Salem, Mass. This department is modest in size but the product of the department equals in quality that of some larger schools.

"Every elementary and high school should have a printshop"

Says S. J. Vaughn, B. S., Head of Manual Arts Department State Normal School, DeKalb, Ill.

About nine years ago. I put a printshop into the Normal School at DeKalb, Illinois, and began to teach printing to the sixth, seventh, and eighth grade boys of our Practice Schools. I had long been an advocate of printing as a school subject, and this gave me an opportunity to test my theories by actual experiment.

The results have been beyond anything I ever anticipated. Printing seems to do for the education of the boy what it has done for the development of civilization in the centuries past. It links a boy up with his fellows in a common enterprise; it makes him an essential part of the various activities of the school community; it makes him intelligent with reference to one of the greatest industries of all peoples; and when properly taught, it gives him in a most interesting way the fundamentals of much of the regular work of the school. A boy likes printing. He will stay in school for it, or he will come back for it from the street and the alley.

Without regard to the trade and vocational significance of printing, I feel that every elementary school and high school should have a printshop for the educational influence it has upon the boys. When we consider these values together with the vocational possibilities of printing, we are not surprised at its popularity and rapid growth.

Sincerely yours,

S. J. VAUGHN

For information concerning cost of equipments or installation of same, write any Selling House Manager or the Educational Department

INDUSTRIAL-ARTS MAGAZINE

Vol. VI JANUARY, 1917 No. 1

BY BREAD ALONE?

Wm. Hawley Smith

A FEW days ago I was talking with the principal of a Manual Training High School, and he told me something of several of the problems that he is "up against" as he strives to do the best possible thing for each one of the pupils he has charge of. (And I pause, right here, to remark that it is a principal of this sort, and of this sort only, that I have time to talk with. The other kinds—well, they don't appeal to me. I wish there were no other kinds.)

And here are some of the things this good man said, which are well worth repeating, and which may well give pause to every principal and teacher in manual training schools, in especial, and perhaps to some others(?)

"One great problem that I lie awake nights over," he said, (and I like a principal or a teacher who, now and then, lies awake nights over the school problems he or she is up against—not too much lying awake, but, anyhow, enough to show a real interest in the work in hand) "is what to do for my boys and girls *besides just teaching them how to make a living.*

"The fact is," he went on, "that at least ninety per cent of the pupils who come to this school have, when they enter, as the chief aim of their coming, the purpose to learn how to make a living; and most of them want to learn how to do this in the easiest possible way, and get the most money for what they do at the least possible expenditure of time and labor. They are simply obsessed with the get-rich-quick idea, which is so pronounced in the spirit of this age—to get this, not by crooked means at all, but, somehow, to be put into such shape, here in this school, that they can get a lot of money for a little work, all the time wearing good clothes, and without getting their hands dirty. That may be a pretty raw way of stating the situation," he said, "but it is the brass-tack-business-end of the way things really are in my school, and my notion is that we are not alone in the matter."

And then he continued his remarks, something as follows: "Of course I understand, as well as any one the fact that, in a way, the ability to make a living is one of the first essentials of a successful human life. The Bible is right, when it says, 'If a man will not work neither shall he eat;' but what I want to get my pupils to see is, that working and eating do not, alone and of themselves, make up *all* there is of human life. And it appears to me that this is something that, somehow, we who are in the manual training work are in danger of overlooking—or, perhaps better, we are in danger of letting our pupils get their diplomas and get away from us without leading them to realize this fact.

"Now I well understand that no one school can teach everything—can do everything that needs to be done for every pupil that enters its doors. But it does seem to me that there are some things that are much more essential to a successful human life than some other things are, and that we ought to do our best to get as many of these main things to our pupils as possible. Of course, in our particular school, in the very nature of the case, the most predominant work we try to do is to teach our boys and girls how to make a living. The question that confronts me is, can we not do something more than this; can we not do something to help them to rightly use and truly enjoy the living we teach them to make? And how to do this is what is worrying me."

He stopped talking to me for a minute, while he listened to a pupil whose special needs required his immediate attention, and took up the subject where he had dropped it:

"You see, the trouble I have in my mind's eye is right here: No one can make any great success of life unless he has *resources within himself for entertaining and taking care of himself when he isn't at work.*"

He stopped right there for several seconds, and we looked at each other, saying volumes, each to each, with our eyes, as these last words of his sunk into our understandings and our hearts.

Then he went on:

"For a number of years I have been keeping track of our graduates, after they leave our school and go to work. I say go to work, because most of our pupils have to go to work as soon as they leave us. Only a small percentage of our graduates, or the graduates of other schools like ours, go on to higher educational work in colleges and universities. The work we are set to do here is, for the most part, to fit pupils for

life and not for *college*. That's a leading fact in all schools of this sort, and it is just as it ought to be in this regard. The trick is to find out what is the best thing to do for our pupils, by way of fitting them for life—for *all of life*, and not for a *part* of it; for *using life* as well as *making a living*.

"Well, watching these graduates of ours, I have come to the conclusion that where ever so many of them fall down is that they *have no resources of their own, as I have said, for entertaining themselves when they are not at work*. Of course, it goes without saying that some kind of entertainment is what everyone needs and really must have when not at work. *That's a fundamental principle of human life that we have finally come to understand*! To be sure, the old Puritanic idea never took this great fact of human existence into account at all. Their way of treating life was made up of an infinite series of 'dont's'. They always told mankind what they must *not* do, and made little or no provision for helping them to *do* what needed doing for the best welfare of all parties concerned. But we have learned that this is not the true way to make the best of life, and I feel that it is up to us to find some way to do what needs to be done under the circumstances.

"Once in a while I go to the 'movies,' " he went on to say, "and I always see a number of our graduates there, and the same thing is true of all sorts of 'entertainment.' It seems to me that the mental attitude of these folks is that they all want *to be entertained*, rather than to *entertain themselves;* and when I have inquired into this condition of affairs, I have found that the reason they do not entertain themselves is because they haven't the ability to do so. The question that suggests itself to me is: Can we, in our Manual Training High Schools, do anything more than we are now doing to help them get this ability? That's what I'm up against."

And then this earnest man stopped talking again and looked at me as much as to say: "Have you any suggestions to offer that may be of help to me?" It was a worthy challenge, and I felt that it was "up to me" to say something, if I could find anything worth saying. (For it was no use to talk to this principal unless one had something to say that was worth saying.) So I said: "Give me a few minutes to think over what you have said, and if anything comes to me, I'll let you know." And it was so.

I got off by myself in a quiet corner, and stayed there, thinking, for an hour or so, and here are some of the things I thought, and which I afterwards told to this principal, and which I here pass on to you:

In the 71 years that I have lived in this good-and-bad world, I have learned, among a good many other things, that "experience is a good teacher, if it don't kill us!" as an old lady friend of mine used to say. And as I "sat in the corner" and thought over my own experiences-by-way-of-entertainment—stood myself off, as it were, and looked at this part of my life; considered whether I most needed to be entertained or could entertain myself—as I looked over these experiences of mine, which I had lived thru and which had not killed me, I found that, while I greatly like to be entertained yet, as a matter of fact, I have had to entertain myself a good share of the time I have lived in this world, when I was not at work. And then I asked myself how I had done this, and how it came about that I could do it?

Now, I know that no single experience will fit all cases; but the more I think of my own experience in this matter of self-entertainment—of not living by bread alone—the more I am convinced that there may be something in what I have gone thru (perhaps a good deal) for others, (perhaps many) besides myself; and, especially that there may be something (I hope a good deal) for the principals and teachers of Manual Training High Schools. And that's why I'm writing this paper.

So here is what I passed on to the principal I had been talking with, after my hour with myself in the corner: (And, by the way, it is a good thing to do, to go off in a corner, all by yourself, and think out, *alone*, the problems of life that you are up against. Jesus did this, for forty days, at the end of which time He had arrived at some conclusions that have never been surpassed, and His method is well worth trying, under similar conditions. I've tried it a good many times, and it always works well with me. I commend it to your consideration).

I'll not quote what I said to this principal, but just tell it to you, direct, as I did to him.

My chief source of self-entertainment, all my life, has been *reading*. When I discovered this fact, as I thought this part of my life over, I naturally asked myself how it was that I acquired this art which has been so helpful to me thru the years? And here is what came to me:

My mother first headed me in the right direction on this count. My father was a "college man," but he was too busy making a living to head me much of any way. Mother knew "little Latin and less Greek," but she did teach me what to read, and how to read it. She never studied pedagogy, and, theoretically, she knew little or nothing of the "science and the art of teaching." But let me tell you what she did for me by way of teaching me reading, and by that means, of how to entertain myself—to live on something besides bread alone.

She began by entertaining me; and then she gradually led me along a way by which I could entertain myself by using the means by which she entertained me. (Say, isn't there a fine pedagogical principle wrapped up in that sentence? Read it over again, and think of it as applied to any sort of teaching, and I think you'll find that there's a lot in it that doesn't show on the outside).

That is, mother began to teach me how to read and what to read by reading to me. I had a sister who was two years younger than myself, and we sat at mother's side and listened while she read to us. She was a farmer's wife and not naturally strong, and she worked a good deal harder than many a slave has worked; but she read out loud to us, many a time and oft, as the days went by, in spite of all the hard work she had to do. (And she lived to be 87 years old, and was in the full possession of all her faculties to the very last. Think of that, some of you who count hard work as killing.)

It was in this way that I became acquainted with much of the Bible, with Prilgrim's Progress, and Robinson Crusoe and Uncle Tom's Cabin, and many another book of precious memory.

And then, when I learned to read at school (mother did not teach us to read—that is, she did not teach us the mechanical part of reading, but we learned this at school) she took pains to put reading matter that was worth reading, and which was within our grasp, where we could easily get at it. And she used good means and methods to help me get at all this.

For instance, in 1856 and the year following, the years that I was 11 and 12 years old, I herded cattle on the prairies of Christian County, Illinois. Every morning, during the pasturing season, I would go off with the herd a little after sunrise, taking them out into the open prairie, and staying with them till sundown. Not much chance of "being entertained" in that sort of a life. But here was what mother did for me:

Of course I rode a horse to herd the cattle with. And I had saddle-bags (I wonder how many of those who read this will know what saddle-bags are like) in which to carry my meat and drink for the day. In one of these bags mother put what I was to eat and drink and in the other a book for me to read. That is, she gave me nourishent for both body and soul. Verily, she knew the truth wrapped up in the words "Man liveth not by bread alone!"

And so it was that, from early spring to late fall, for two years, from ten to twelve hours every day (the eight-hour day was not then even dreamed of), I took care of a herd of cattle by way of work, and entertained myself with a book when they got their bellies full, and lay down to "ruminate," which was a considerable percentage of the time.

I read a lot of books during those two years, and I remember much of what I read, even to this day, and I could tell you ever so much about it, right here, if I had time and space to do so. But never mind about that.

A little later, mother built a low shelf for books just over the head of my bed. The head of my bed was not very high, as it stood in the corner of that little old chamber of mine, in that plain old farm-house of half a century ago, and mother built the shelf so low that I could reach up to it and get a book without taking my head off the pillow. Mother was a wise woman. She knew that I was lazy, (all growing boys and girls are lazy) and she planned accordingly. And there is something to think about right there, too.

And the dear woman didn't "nag" me or "get after me" to read the books she put on that shelf. What she did was to say some little thing about some of the books, one at a time, which would *excite my curiosity or arouse my interest*, and then leave the rest to me. (Something to think about right there, too.)

And many are the books I read from off that shelf. Hundreds of hours would not measure all the time I entertained myself, as I lay, propped up on pillows and read in bed. Indeed, that way of reading is a favorite with me yet, and I still practice it, to a greater or less degree, days, nights and Sundays.

And that is how I learned to entertain myself when I was not at work, and to do something worth while outside of merely "making a living." That is how I came to know that man cannot live a whole life by bread alone, and found out how to get the other things needful for really living. So much for that.

Well, when I got to teaching school, almost unconsciously, as I see it now, I practiced with my pupils the ways and means which my mother worked with me. Anyhow, I never learned such ways and means in the formal schools, which I attended. And here is what I did: For two years I taught what was called "the high school department" in a four-room school building in a country town. I had an average of 77 pupils, (as fine a lot of lusty boys and buxom girls as ever grew) and I took all the care of them myself. I don't say this to brag, but just to state a fact.

Well, with all that "bunch," and with all the teaching that had to be done, here is the way I managed the reading part of it: *I put the whole* 77 *pupils into one reading class* and we read 45 minutes every day. I say "read" but I should add that we also talked a good deal about what we read. We read some regular "reading books" during those two years, and we read many books which are not included under that title, such as "Ivanhoe," "Tale of Two Cities," some of Shakespeare's plays, and parts of several other books. I can't go into the details of how we did this; but for the most part, I used mother's plan, namely, to do enough reading and say just enough about the books we tackled, *to excite the curiosity and arouse the interest of the pupils*, and let them do the rest. *And it worked.* I have kept track of a number of those pupils, and all those I know about have always been able to entertain themselves with books, to a large extent; and their so

doing has given them something more than bread alone to live on.

Then, still later, when I had quit teaching in schools and was "in business," running a planing mill. I had a lot of boys working for me, and they used to give me a good deal of trouble during the "noon hour," racing about, and "raising Cain" generally, all over the shop. And the question was, what to do about it? And I went off in a corner, all by myself, and thought about that, too.

My foreman was a clever man in more ways than one, and I found out that he loved to *read, especially* certain books—so I asked him if he wouldn't read some of the *books he loved the best* to the boys, during the noon hour. And he did it. And the plan worked, almost to perfection.

I told him about how mother got me to reading, and of how I worked the same method in the schoolroom, and suggested that he try this plan with the boys. And he did. He began with "Nicholas Nickleby." He sat on a "saw-horse," with the boys grouped around him on benches and boxes, and read and talked, and *excited their curiosity and aroused their interest. He loved the book, he knew it by heart,* and because of these things he was able to communicate his mental and soul attitude to the boys. (And there is something right there to think about, too.)

And the boys "caught on" all right. One day, some weeks after this plan began, I was going thru the mill, and one of the boys, (I had counted him quite an ordinary fellow, scarcely up to the average) asked me if I had read Dickens. I said I had, and then he asked if I had read "Dombey and Son?" And when I said that I had, he said: "Wasn't 'Di' a bully dog?" That's how I knew that he had "caught on."

Well, all this was more than twenty years ago, for time flies. I have kept track of several of the boys who once worked in the mill, and who there got a taste of something more than "bread alone" to live on, and I find that they still "have meat to eat which the world knows not of." They learned how to earn a living, as they ran my machines; but they got something more than mere cash wages during their stay in that old shop of mine for all of which I give thanks, as I sit here and write about it.

These are the stories that came to me as I sat in the corner and thought, and which I later told the principal, and which I here tell to you. What I suggested to him was, that he try mother's way of getting something more than the mere ability to earn a living to his boys and girls, that he set them on a way whereby they could entertain themselves, that he get the idea to them that they cannot live by bread alone, and give them tastes of that which is so good that they will always want more of the same. He said that the plan "looked good" to him, and that he would see if he couldn't work it, in some form, in his school. I hope he can; and if the method appeals to you, I'd be glad to have you try it, too.

And if you do try it, just a word: To make this plan work, the first (and the hardest) thing to do is to find a teacher who really *loves some books.* It doesn't make so very much difference what these books are, provided the teacher *loves* them. Emerson says that "he only can give who has;" and if a teacher has no *love* for a book, he or she can give no *love* for that book or any other book, to anybody. That's why so much of our alleged teaching of "literature" in our schools amounts to so little. (Think of that, too.)

For the most part, the teachers of literature in our schools are *compelled* to take for their textbook a compilation of "selections" which they care little or nothing about, which they surely do not *love,* and their "teaching" consists in making their pupils "commit to memory" rather than "learn by heart" (and there is all the difference in the world between these two things) these bits of this or that to which neither teacher nor pupils respond. And nothing could be worse than that.

But if, in any Manual Training School (or any other school, for that matter) a teacher who *loves books,* and who has the ability to *excite the curiosity and arouse the interest* of the pupils in these books, or others—if such a teacher can be "turned loose" among the "bunch," and given his or her way in the premises, I am sure that, to a considerable degree, at least, the pupils will learn in such school something more than how to make a living, which is the proposition we started out with.

Such schools will teach their boys and girls how to earn a living and how to utilize "the meat which perisheth," but they will also give their pupils a taste for something more than "bread alone," yes, for the very "bread of life."

"Blessed are the horny hands of toil.
The busy world shoves angrily aside
The man who stands with arm akimbo set,
Until occasion tells him what to do."

—*Lowell.*

Pottery: A First Course in Manual Training

L. Day Perry, Supervisor of Manual Training, assisted by Marguerite M. Scully,
Instructor in Pottery, Joliet, Illinois

ORGANIZED manual activities begin, in our system, in the sixth grade, and the medium for motor expression is clay work or pottery. Pottery is selected for the introductory course in manual training because of the plasticity of the medium, which results in relative ease of handling and manipulation. In woodwork—perhaps the stable course in the manual arts—errors are difficult to correct, and repetition of work is frequently necessary. In pottery, within certain limits, errors are readily corrected and the necessity for remaking a given problem is reduced to a minimum. Pottery will invariably hold the interest of the beginner, for he may handle the clay with relative dexterity, the problem grows rapidly, and the progress from the simple to the more complex problems is accomplished thru easy stages. Because of these facts and other obvious ones we have concluded that pottery is the best medium for the beginner in regular manual training work.

A course in pottery, as in other branches, is subject to reasonable variation and modification. It is the aim to have the problems in proper sequence, and reasonably difficult, so there may be definite appreciation of the work, with resultant pride in ultimate ownership. The articles are all practical and designed for service. The character of the class is a pertinent factor in determining the type and nature of the problems for it.

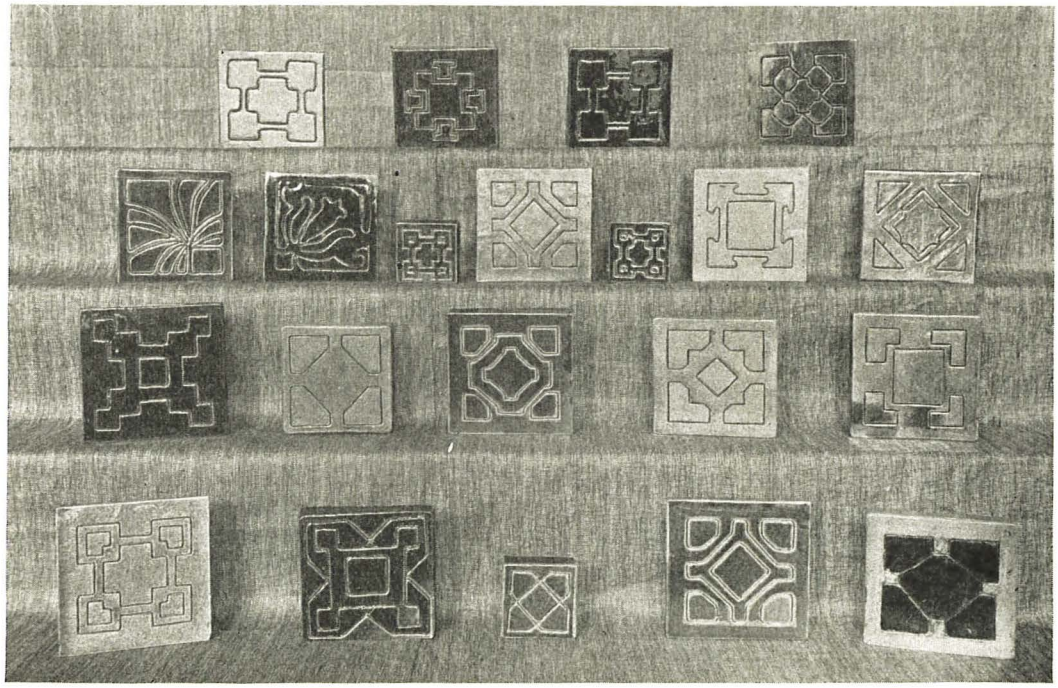


Fig. 1.

The Design Element.

The medium in which the worker labors naturally limits him. No design can go further than be complete within its limitations. Any article in the manual training field must be of service to the community or individual, be made of some durable material, and possess beauty of proportion, outline and color. Inasmuch as pieces of pottery are small, and subject to scrutiny, unusual care must be given to their designing. The function of the article is paramount; it must fulfill a need in the home to which it goes, and the maker should understand its use and be encouraged to actually use it. Structural design is considered first in planning the project, that is, the mass and outline of the subject without added ornament. The problem must be pleasing in form and proportion without applied design. Frequently an article which is poorly proportioned has ornament added to it with the object of enrichment but no amount of applied design, no matter how well executed in itself, can improve an article structurally wrong. The problem of the instructor in clay is that of building a serviceable piece of good proportions, and so enriching it in outline and by the application of design, that its utilitarian value is unchanged and its aesthetic value and interest is increased.

The Course.

The first problem in the course is the paper weight. Three are illustrated with the tea tiles in

Fig. 1. The weight must be sufficiently heavy for its purpose and easily handled. Some form of decoration improves the structural design, and inasmuch as incising is within the province of the beginner, this form of decoration is applied to the surface of the weight. The weights illustrated are $2\frac{1}{2}''$ square and $\frac{3}{4}''$ thick. They are built from a single lump of clay, well worked with the hands.

The second project is the tea tile. A number of these are shown in Fig. 1. The size of the tile may vary, governed by the individual requirements. Figure 2 shows the development of the problem. a rolling pin or any round rod roll out clay to $\frac{1}{2}''$ thick and sufficiently large to obtain a 6″ square. Then roll out a second piece of clay to $\frac{1}{4}''$ thick and cut four strips one inch wide and two of them at least six inches long. Reference to the working drawing must be made when measuring. Now cut out a six-inch square by means of a square or templet and knife, and lay it on a plaster-of-Paris plaque, previously moistened. Moisten the surface of the clay with slip (clay reduced with water to the consistency of thick cream) and lay the strips on as indicated on the drawing. Press them down firmly with modeling

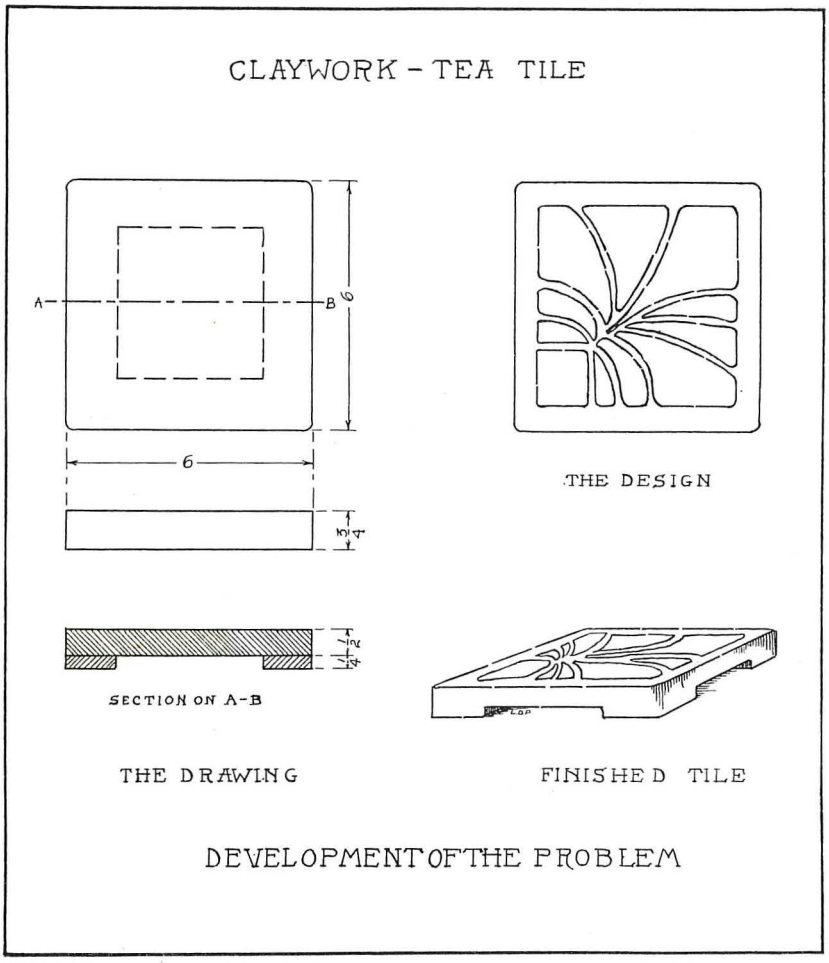


Fig. 2.

The sheet shows the drawing, the design and the finished article. After the details of the structure have been carefully thought out a working drawing is made. This is followed by a design whose purpose is to beautify the tile, without impairing its utility. In this instance the clay is incised. The color is then determined. Underglazing the design units in suitable colors is a very effective method of surface enrichment. Finally a sketch of the finished problem either in perspective or isometrics is made. The steps are thus assembled on a single sheet for reference.

The process of construction is as follows: With tools and work the edges well with the fingers. As both clays are of the same consistency the strips become an integral part of the square piece, if properly worked together. True up the piece again, smooth the edges and corners with the fingers, and then lay aside until the clay becomes leather hard. Keep the tile under a weight while drying, or turn it from day to day, to prevent warping.

Transfer the design from the development sheet to a good grade of drawing paper, then moisten the back of this paper and smooth it down over the upper surface of the tile. With a fairly sharp pencil trace firmly over the lines of the design. An impression

is thus produced on the leather hard clay. Remove the paper and with a steel tool or pointed nut pick incise the surface on the lines. Use a straight edge to guide the tool on straight lines, and cut clean grooves sufficiently wide and deep to assure a clear design after the glaze firing. If made too shallow the glaze is liable to fill up the grooves and make the design indistinct, or obliterate it. When the incising is completed smooth all rough edges with the fingers, moistened in slip or water if necessary. If the design calls for an underglaze apply it while the clay is relatively moist, otherwise set the tile away until thoroly dry. It is then ready for the first or biscuit firing. Thru the medium of underglazing and glazing the pupil gains an appreciation of color, made permanent thru the discussions on colors which naturally precede their application.

The third problem of the outline is the wall pocket shown as part of the group in Fig. 3. The pocket is made of two pieces from patterns previously cut. This and all problems in the course are developed in the same manner as indicated in Fig. 2. The back piece is about three sixteenths of an inch thick. The front piece is the same thickness. A wood block of proper form is used in cutting the front piece. The strip of clay is smoothed down over the block, the edges trimmed sharp, and the form removed. The back is then attached by means of slip, and by working the edges well with the fingers. It is obvious that the clay must be of the right firmness to prevent the pocket from assuming a different shape. The design is applied and worked similarly to match the tea tile, and may be planned for relief or inlay at the option of the worker. The hole for hanging the pocket is best bored with a twist bit when the clay is practically dry.

The bowl forms, shown in Fig. 4, were built up of coils. They are problems involving, primarily, constructive design, in that no design is applied to them. Their enrichment is dependent upon an intelligent use of the curve, and of color thru the medium of glaze. A pattern of the exterior shape of the given forms is made from the drawing to guide the worker while building the piece. Construct the base by rolling out clay to the required thickness, and with a pair of dividers scribe on it the required circle. Then with the palm of the hands roll out coils of clay three-eighths of an inch thick. Lay one upon the base coincident with the scribed circle line and work it well into the base by pressing and pulling slightly out and up. Use the thumbs inside the form and smooth up each successive coil, and work into the preceding one. The pattern or templet must be used constantly as the work progresses. When as smooth as possible and in as good a shape as possible for the first handling, set aside until leather hard, then smooth and mold the form to final shape.

Bowl and vase forms may be centered on a potter's wheel and trued up with the usual wheel tools, if desired. The fingers are the best agents for the final finishing even when the wheel is employed. It is good practice to cut out under the base one-fourth inch from the edge and one-eighth inch deep, to permit the forms to stand well. This also provides an excellent area for incising the name of the maker. The name for identification is very important in a busy shop of large classes.

The forms shown in Fig. 5 have designs applied to them. On the tall forms and on several others the design in relief is produced by cutting away the background with flat, steel tools. When the clay dries a very fine sandpaper may be used efficaciously

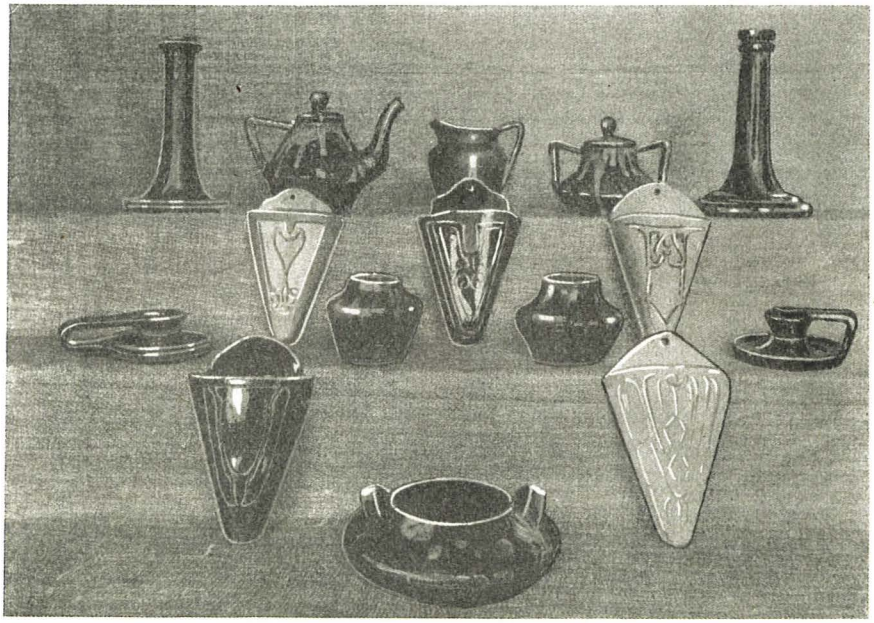


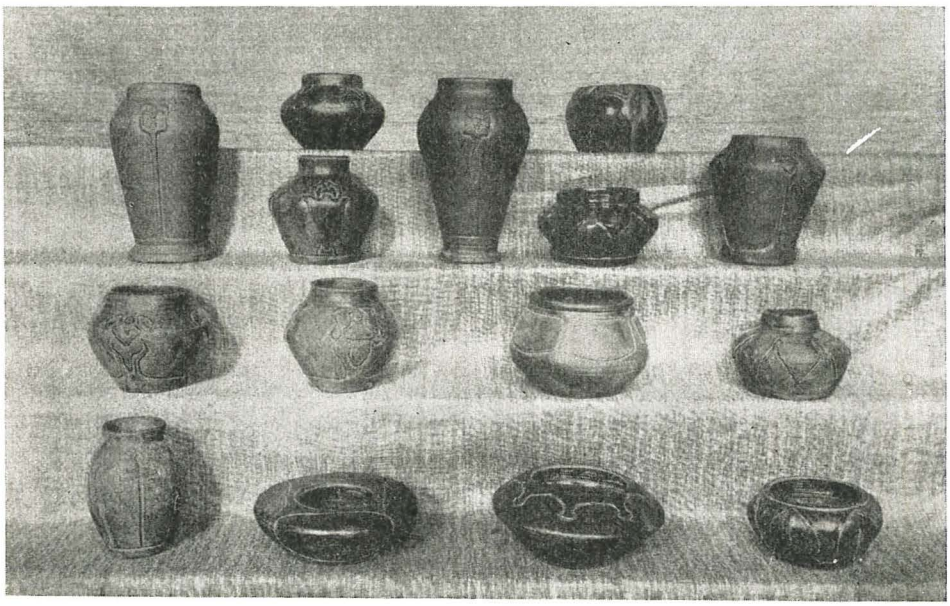
Fig. 3.

in smoothing out irregularities. Other forms illustrated are incised, and one has design in relief produced by adding clay and working to shape. This last method is rather difficult for the average pupil in this grade.

The pourers and sugar bowl, in Fig. 3, represent work of more skillful boys, and rapid workers. These employ appendages in the form of handles, spout and covers. The place and method of attachment and the proper form of covers must be carefully planned to fit the structures. The appendages must be in unity with the structure and appear to attach themselves unobtrusively. It takes but little to transform a pleasing and well proportioned article into one distorted and ugly; improper designing and placing of appendages will accomplish the transition. There is no license which permits the placing of appendages to structures for other than utilitarian purposes, and unless there is need none should be added. These should be very carefully applied with slip, for unless they are worked well onto the body of the problem they will detach in the first firing.

Covers and lids need to be made larger than a snug fit when moist, for clay shrinks appreciably in drying and firing. In all problems, where necessity demands, proper allowance must be made for shrinkage. This is approximately one-eighth of an inch to the inch.

The clock forms, shown in Fig. 6, were made from a single piece of clay, well worked and formed into a brick about an inch in excess of the dimensions indicated in Fig. 7. This figure shows a second model sheet of the development of a problem. The design provides for three depressed areas to be cut out with steel tools, and for a continuous incised margin. When the brick has dried to the right firmness lay the pattern of the form on the smooth side of the brick and mark around it with a small, sharp knife. Similarly mark the thickness, then cut out the shape, and trim to indicated thickness.



Above: Fig. 4. Below: Fig. 5.

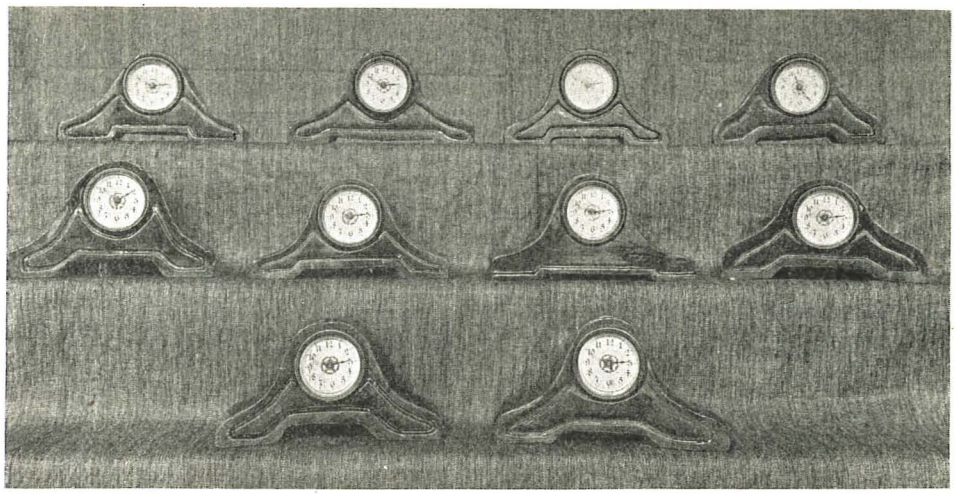


Fig. 6.

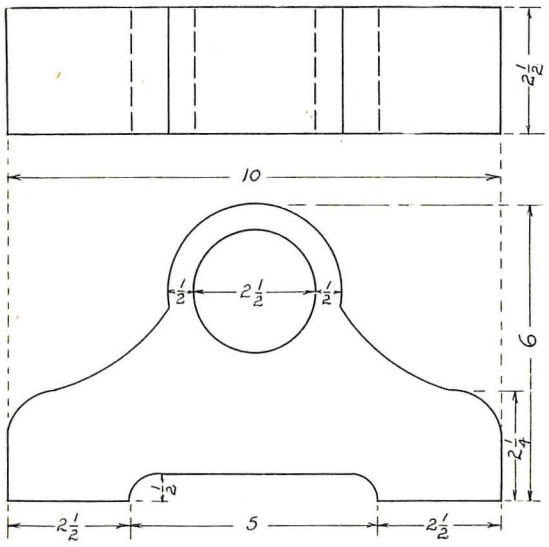
Keep true with a square. Follow by cutting the circular hole which holds the clock. Smooth the entire shape with the proper tools and the fingers, then transfer the design and work it out in the usual manner. Should the clock be too heavy it may be lightened considerably by cutting a hollow underneath the base. Fit the works before the biscuit firing, for it will prove extremely difficult to remove any amount of material after firing.

It is sound pedagogy to have the pupil understand, in a general way at least, his project as regards construction, function and ornamentation before it is begun in the shop. The two plates, Figs. 2 and 7, which show the method of developing the problems, and which are typical, appear to be a sensible and tangible way to work out the projects. From these sheets the pupil develops his patterns and templets and designs for use in the pottery shop. Thru them he may work with intelligence and maximum assurance. It is not presumed that all the forms and designs shown in the various photographs are correct and pleasing, but they do represent honest work and effort on the part of sixth grade boys of average ability, and they are representative.

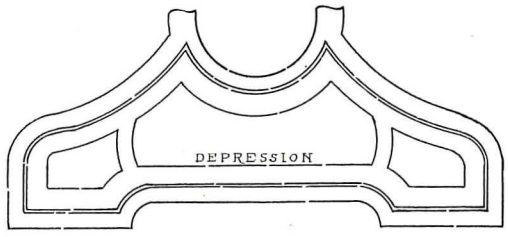
The various articles in Fig. 8 were constructed by sixth-grade boys. It is the aim to have all problems in proper sequence, and those discussed represent a gradual transition from simple modeling to the application of appendages. Special problems are permitted boys who show ability to handle them. Each piece is finished in its entirety in the shop, from the working of the clay to glazing and firing. Each article is the property of the maker, unless it be a group problem. The course in pottery is a half year in length, with class periods of three hours once a week.

Equipment.

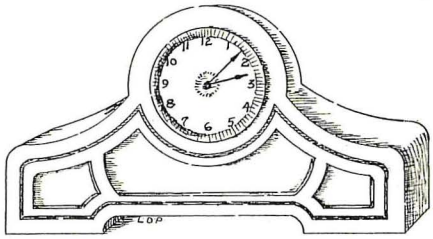
While "the thumb is the best tool in clay work" it is proper and necessary to employ additional agents. There is no danger of over-equipping a clay shop if



WORKING DRAWING



THE DESIGN



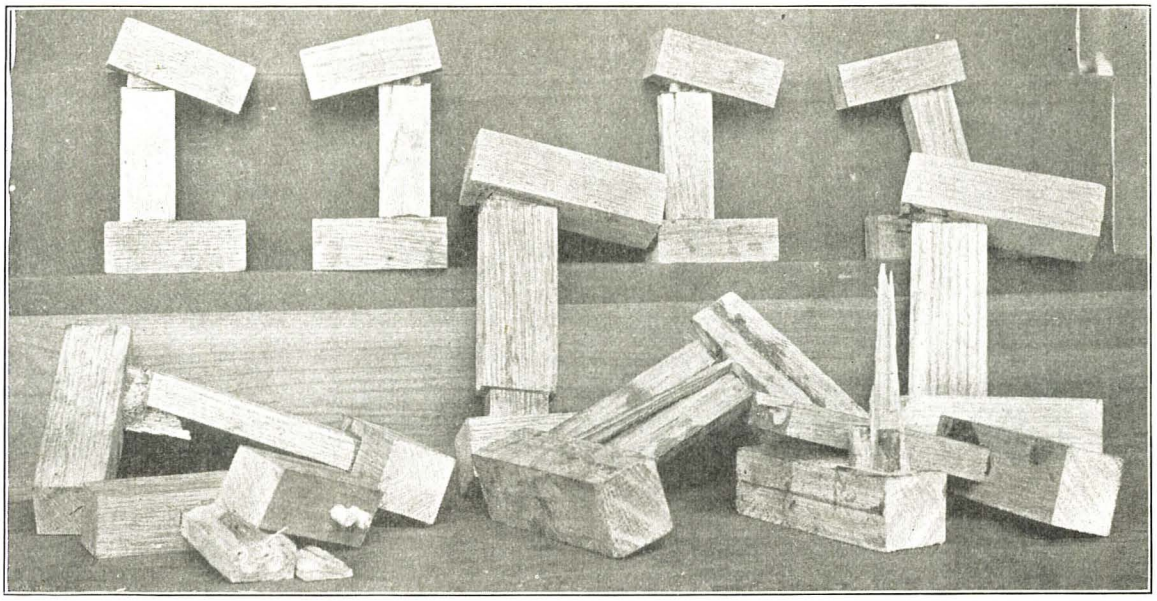
FINISHED PROJECT

Fig. 7. Development of Problem.

the equipment is planned and purchased under the supervision of an experienced instructor. In the following list of equipment no attempt has been made to indicate a "minimum" one; for it is an indisputable fact that the averge worker will accomplish more and better work, and develop better, if he has at his command a full and well selected equipment of good tools and accessories. The equipment is planned for a class of thirty. Twenty pupils may be said to constitute an average class, altho more may be handled with comparative ease if the problems are arranged in groups. It is assumed that the shop is in use at least ninety per cent of the time. Were the equipment planned for the average class certain pupils would of necessity work at a disadvantage in the larger classes; hence the planning for a maximum number.

1 Only	Kiln. Approximate capacity 30″x24″x20″.
4 Doz.	Shelf Supports.
1 Doz.	Shelves.
2 Doz.	Tile thimbles.
6 Doz.	Stilts, assorted.
4 Doz.	Each 05 and 06 cones.
1 Only	Partitioned zinc lined cupboard, with plaster-of-Paris shelves.
1 Only	Display case.
1 Only	Cabinet, for tools and accessories.
2 Only	Tables, zinc covered, 20′x3′.
1 Set	Shelves for drying projects.
1 Only	Clay vat.
1 Ton	Refined clay.
50 Lbs.	Glaze, assorted colors.
1 Bbl.	Plaster-of-Paris.
1 Only	Emery wheel, hand power.
6 Only	Potters' wheels, foot power.
2 Doz.	Turning tools, assorted.
3 Doz.	Stools, 24″ high.
1 Doz.	Enameled dishes, covered, for glazing.
1 Doz.	Enameled cups, for glazing.
1 Doz.	Aluminum spoons.
1 Doz.	Glass jars, covered, capacity one quart, for glazes.
1 Doz.	Glaze brushes, assorted.
1 Only	Sprayer.
1 Only	Dipping vat.
6 Only	Sponges.
4 Only	Enameled or galvanized pails, 3 gal. capacity.
6 Only	Fine copper screen strainers.
3 Doz.	Rolling pins or round rods.
1 Q're.	Sandpaper, No. 00.
3 Doz.	Rules, 1-foot.
3 Doz.	Nut picks, sharpened points.
3 Doz.	Steel scrapers.
2 Doz.	Steel plaster tools, assorted.
3 Doz.	Boxwood modeling tools.
6 Only	Dividers, 6″ and larger.
1 Doz.	Sloyd knives.
1 Doz.	Butcher knives, medium.
	Plaster plaques, made in shop.
	Pencils.

Fig. 8.



TORSIONAL AND GLUE BOND TEST PIECES.

DOWEL VERSUS MORTISE AND TENON JOINT

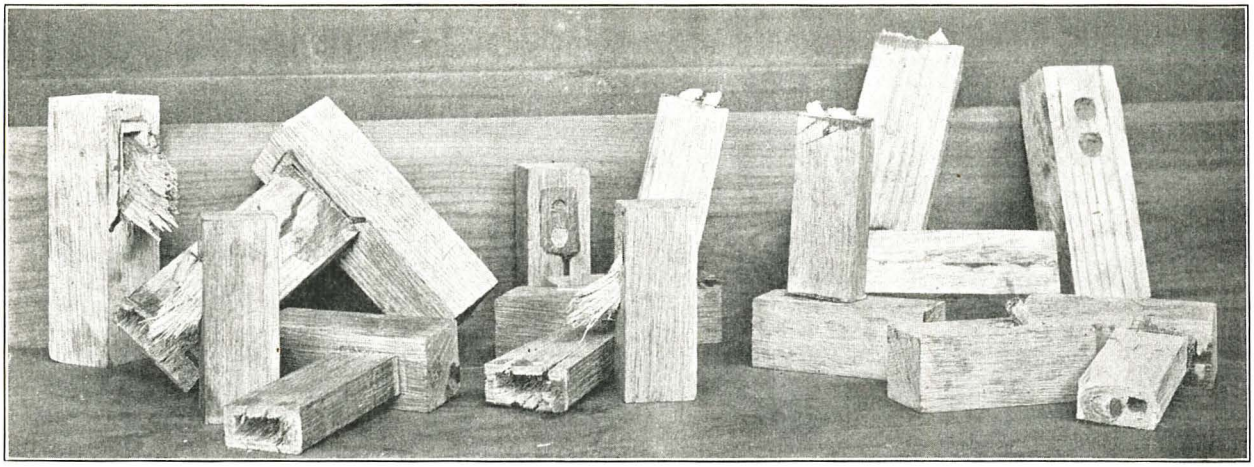
Hans W. Schmidt, Oshkosh

OF late there have appeared several articles in the technical and professional press on the relative strength, merit, etc., of the various kinds of joints used in the woodworking industry, especially those closely connected with the furniture and cabinet-making trades. The dowel and the mortise and tenon joints are before the tribunal of popular opinion. Each has its advocates and the merits of the two kinds of joints are set forth in detail by the various champions. The "doweler" claims for his joint equal strength with the mortise joint, ease of making, its wide use in the furniture industry, etc., while the "tenoner" on the other hand claims greater strength, better mechanical construction involved in its making, its use in the highest grade of furniture, etc. In reading all of the various arguments made for each kind of joint one finds himself between the "devil and the deep blue sea" so far as real basic facts are concerned or the evidence of convincing tests. We have had articles dealing very deeply with the theoretical aspects of the matter, how to calculate the length and depth and size of mortise and tenons or dowels, their spacing, the amount of tolerances, etc.; we have rules for all of these things, but we have had no reports upon the result of the two kinds of joints under parallel conditions in practical work, their relative strengths under equal conditions of use, or rather abuse.

In order to arrive at some definite conclusions, the writer, in conjunction with Mr. F. R. Polk, instructor in cabinetmaking, carried out a series of tests with mortise and tenon joints and with dowel joints under conditions as nearly alike and as practical as may be, to determine the strength of these joints as regards shear, torsion and glue bond, these being the stresses most likely to be set upon in actual pieces of furniture. In the majority of cases six or more pieces of each kind and size of joint were used and the dowels and tenons were proportioned and made under the same conditions as if they were parts of bona fide furniture; no extra pains were taken with them and all of them are the product of student labor. The dowels were of birch, $\frac{3}{8}''$ and $\frac{5}{8}''$, while the tenons were $\frac{3}{8}''$x1$''$ and $\frac{5}{8}''$x1$\frac{3}{4}''$, the depth in all cases being 1$''$. The tests were carried out to set up shearing and torsional stresses and the glue bond test was made to give as near as possible a racking test, to throw the strain on the glue.

The results were as follows: The average shearing strength of the $\frac{3}{8}''$ dowel joints was 1,437 lbs.; of the $\frac{5}{8}''$ dowels, 2,537 lbs. The $\frac{3}{8}''$x1$''$ tenons broke under a strain of 3,435 lbs., while the $\frac{5}{8}''$x1$\frac{3}{4}''$ tenon stood up under a strain of 4,175 lbs. The average strength of all of the dowel joints was 1,967 lbs., while that of the tenons was 3,805 lbs. Thus it will be seen that the tests indicated that the strength of the mortise and tenon joints bore a ratio of almost exactly 2:1 to that of the dowel joints.

The relative torsional strains showed a ratio of 32:15 for the $\frac{3}{8}''$ tenons and the $\frac{3}{8}''$ dowels and a ratio of 35:19 for the $\frac{5}{8}''$ tenons and the $\frac{5}{8}''$ dowels. The average ratio of the strength of all of the tenons to those of the dowels was 38:17; again nearly two to one.



SHEAR TEST PIECES.

The tests for glue bond or racking gave the following results. The ratio of $\frac{3}{8}''$ tenons to $\frac{3}{8}''$ dowels was as 5:3; for the $\frac{5}{8}''$ tenons and the $\frac{5}{8}''$ dowels it was as 9:6. The average ratio was as $7:4\frac{1}{2}$.

From the above tests it will be seen that a very remarkable uniformity existed in the ratios of the strains under which the joints broke down, viz., nearly 2 to 1 in favor of the mortise and tenon joints. To the writer this seems quite in keeping with the "constructional" facts. The areas of contact of the tenons is in every case greater than that of the dowels and must always be so under practical conditions and one would expect a greater strength in the tenon joints. The breaks and failures of the various joints are well shown in the photographs which represent average conditions.

It seems to be well established from the above facts that the mortise and tenon joint is the stronger of the two joints, but what no tests will ever show is when to use a dowel joint or a mortise and tenon joint. The fact that a tenon is stronger than a dowel does not condemn the latter joint—each has its place and use, neither does it seem fitting to condemn the mortise and tenon joint because one has used a dowel joint mostly or to claim that it is just as good as the mortise joint. There are places where no mortise and tenon joint or its cousins, the housed or feathered joints, will take the place of the dowel joint and again no dowel joint should be used where a mortise and tenon joint could give needed greater strength. It has been argued if a dowel joint at certain place in a piece of furniture will break down with a strain of 150 lbs. and the stress will not exceed 75 lbs., there is no need to use a mortise and tenon joint capable of withstanding a strain of 300 lbs. The argument would be a sound one if we were always sure of the ensuing conditions, but it is good engineering practice—and why not good engineering practice in furniture-making and design—to make allowances for the unforeseen and to increase the factor of safety if it can be done with little additional expense. Nor is the argument valid that because many furniture factories use the dowel joint, therefore it must of necessity be better than any other. Those of us who have observed the behavior of our furniture will know better. Rapidity and cheapness of production are nearly always the governing factors in such cases.

In conclusion, this article is presented to the professional brethren as a basis of facts and the results of bona fide tests carried out under as nearly practical conditions as possible and each one may draw his own conclusions.

GENIAL manners are good, and power of accommodation to any circumstance; but the high prize of life, the crowning fortune of a man, is to be born with a bias to some pursuit which finds him in employment and happiness,—whether it be to make baskets, or broadswords, or canals, or statutes, or songs. I doubt not this was the meaning of Socrates, when he pronounced artists the only truly wise, as being actually, not apparently so.—*R. W. Emerson.*

An Analysis of a Patternmaking Course

Gerald A. Boate, Newtonville, Mass.

THE object in mind when making these studies is not the exploitation of a particular school or its courses, but to show how the mechanical departments of a vocational or trade school may each lend inspiration and material assistance to other departments of that school so that all may be cemented into a harmonious working unit. The principal object in the minds of all instructors is the education of the boy. The trade training is the center of interest about which all other studies and efforts are grouped. When once interest is aroused in the construction of a pattern, a machine, or a cabinet, drafting, English, mathematics and history are brought within the focus of this center of interest and are also assimilated by the boy, as never before, and to him also become a tool.

The shopwork in the school is made as practical as possible, and is carried on, as far as school conditions will permit, after the manner of a commercial shop.

We have a measure by means of which each year the boy's trade training is brought to a practical test. From about April first onward each year, boys of the second, third, and fourth years of training in this school, are allowed to leave school for the remainder of the school year, when they secure a position along the line for which they are being trained. Each month a report is made to the school by the boy workman, which is signed by the foreman or superintendent of the concern for which he is working. The boy on re-entering school in September is given credit toward a diploma for the summer work which he has accomplished. On June 1, 1916, there were 237 enrolled in this school, of whom 158 were at approved summer work.

The outline of the patternmaking course and the correlation analysis in this article was prepared by Mr. M. A. Barney, and is used with his kind permission.

"A pattern is something shaped or formed to serve as a guide in the shaping and forming of something else." This is a general definition of a pattern and applies to all kinds of patterns, namely: dress patterns, shoe patterns, etc.

The particular phase of patternmaking which we will analyze in this article is that directly connected with the art of founding. For this purpose a pattern is a model usually of wood, the form of which is to be reproduced in metal by means of moulding and casting.

The construction of such models constitutes the art of patternmaking. The development of this art is coincident with that of the founding art. The first metals that man learned to melt were gold, silver, brass, lead, tin, and zinc. These are the socalled soft metals which melt at a much lower temperature than iron. The period of history during which these metals were used is called the "Bronze Age." The first castings were probably for cooking utensils, one of the earliest instances of the correlation of the mechanic to the household arts.

Later in history castings were made for jewelry, ornaments for temples, statues, etc., by the ancient Egyptians, Phoenecians, and Greeks. The "Bronze Age" may be said to have ended with the close of the middle ages or about the time of the discovery of America by Columbus. This period was followed by the "Iron Age" in which we live now.

Iron was not used extensively before the "Middle Ages" because of the high temperature and elaborate apparatus required to melt it. There are records of many attempts to make iron castings, but the first event of any importance was in 1544 A. D., when a patent was granted in England for making castings of iron. However, it was not until the eighteenth century that this work became commercially successful. The event of the steam engine patented by Watt in 1769 A. D. was made possible by improved methods of moulding. It also stimulated the development of the founding art by making possible the use of factory tools, power driven by the steam engine; these devices created a greater demand for metal castings.

In the beginning of this period of the use of machinery a man who built a machine developed his own design, constructed the patterns, made the castings, machined and fitted them, and assembled the parts. However, the use of machines increased so rapidly that the different operations were assigned to different men so that early in the nineteenth century these operations had developed into the separate branches of machine design, pattern-making, moulding and machine work. This differentiation of trades resulted in the more rapid development of each one, so that at the present time each trade has several distinct divisions.

The two principal divisions of the pattern-making trade are wood pattern-making, embracing the construction of wood patterns only; and metal pattern-making, which usually requires a master pattern of extra shrinkage. Wood pattern-making is sub-divided into stove pattern-making and machine pattern-making, and these differ so greatly in construction that rarely can a man work at more than one of them, altho it is necessary to have a knowledge of both. Machine pattern-making is the largest division of the trade, so that when pattern-making is

spoken of without any qualification, this kind is always meant.

In the Newton Vocational School the pattern-making course is organized along very definite lines, with a succession of developments of process that will create an interest in the work, and at the same time lay a foundation of elements and principles that a boy with ordinary mental ability, and old enough to develop a sense of responsibility, can grasp. These also will instil a desire to co-operate with the teacher's efforts to make a success of the work. The beginners are first entertained by short talks on the use and construction of a pattern, followed by demonstrations in moulding and casting, with the necessary explanations of foundry accessories and usages. This is followed by boys moulding a simple pattern and casting in lead, and after one or two efforts the importance of following instructions is clearly realized.

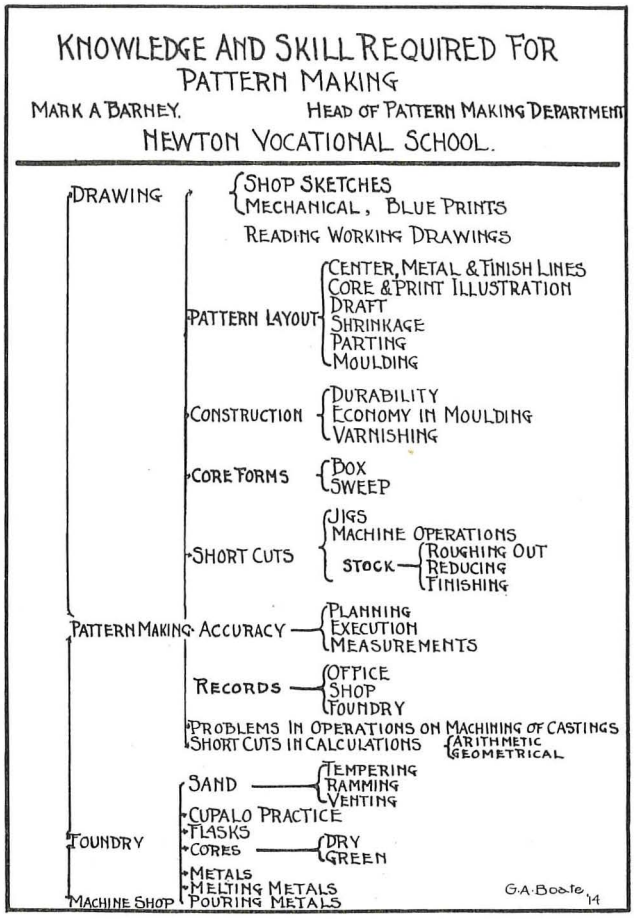
The next step is a preliminary, try out course consisting of six patterns. The first pattern is the most simple and contains the fundamentals which are necessary as a basis with which to start; including the sharpening of tools, and their care and use, planing surfaces true and at right angles, then paralleling of surfaces, gauging, squaring, and center lines, laying out cope and nowel dimensions, so as to give draft to interior and exterior surfaces, working from rough stock surfaces and finishing to a true and accurate surface, also gluing, sandpapering and varnishing.

In the different steps in making a pattern, the student follows a schedule of operations, very definite as to detail, so as to cause him very little embarrassment, as it is a trying time, a time when the instructor can gain his confidence and co-operation. One of the aids for the student is the shop notes which we have prepared for reference.

When the pattern is finished and the classification stamped on it, the student will mould and cast it in lead, the operations identical to the foundry with the exception of pouring the metal, which is really more difficult to pour altho not so dangerous as iron. The interest and enthusiasm displayed by the student in his first casting is interesting and at times amusing. There are congratulations if a success, and jokes if a failure, from the rest of his classmates.

New and interesting problems develop in every pattern, some of the principles are repeated and enlarged upon until the student can, with confidence, start on his first shop pattern, making his schedule of operations, receiving advice and directions at the right time, and we are led to believe in the right way.

Mr. Barney feels sure that using this schedule of operations together with the preliminary patterns has contributed in a large measure to the success



which he reasonably assumes to have had. Altho the idea is not original with him some phases of its applications are. After serving an apprenticeship under a stern tho competent foreman, under whom ten boys, following his apprenticeship, failed to complete the course, Mr. Barney was led to believe that something was wrong with the method of instruction, and has had that experience to draw from in planning his work in this school.

During the first year the student will cover in addition to the work already mentioned: Shrinkages of metals, interior and exterior finishes as they apply to machine construction, simple and built up two and three-part patterns, vertical and horizontal core prints, together with cores, their composition and use, simple segment and stave work, use and care of band and jig-saws, straight and curved interior and exterior cuts, care and operation of wood-turning lathe on simple, spindle and face plate work. About the middle of the first year in the shop, with the written consent of the parent or guardian, the boy is given permission to use the other power-driven tools of the pattern shop necessary for the construction of the pattern. The work in the shop is supplemented by talks and visits to commercial pattern-shops.

During the remaining three years of the course, the work is graded as far as possible to lead up to a working knowledge of a great variety of complicated

pattern work necessary to become skilled in order to work intelligently at the trade. The work is governed to a great extent by the machine which will be built in the machine-shop from patterns made by the boys in pattern-making. All pattern work is carried on from drawings furnished by the drafting department.

Metal patterns, their construction and use, are covered during the course and special attention is given relative to economy of production in the foundry and durability of the patterns. The student will acquire knowledge and skill in sharpening and setting up the various power machines, also a thoro knowledge of their use in an endless variety of ways in order to meet the requirements of our present school-shop system of efficiency.

When the four-year course is completed, the student will have a working knowledge of fractions, figuring board measure, ratio and proportion, mensuration, geometry, trigonometry, enough algebra to understand formulas, mechanical drawing, shop sketching, drafting, tracing, blueprint reading, the application of science to wood and metals, and the weight of castings from the patterns, and an appreciation of the niceties of the trade, such as freedom from specialization, which has entered to a great extent into so many other trades.

The nature of patternmaking is such that the very best grade of soft white pine and baywood mahogany is used. The work is light as far as muscular exertion is concerned. The danger from repetition work, that has a tendency to keep all but the very best mechanics from advancement, is eliminated. In patternmaking very seldom two patterns are made alike, as a great many castings may be made from one pattern.

The correlation of the trade work with drafting, mathematics, foundry and machine-shop, is in itself an incentive for the boy to do his best.

The following equipment is recommended for a class of 24: Twenty-four woodworking benches, each containing one general draw of tools, used in common by students assigned to that bench; six individual drawers each containing knife, two chisels, two gauges, one block plane, one smooth and one jack plane double iron; a cabinet with an adequate equipment of special tools, used in common by all students; one 36-inch band saw, a self-containing jig saw, one universal circular rip and cut-off saw, fox trimmer, one large pattern-maker's lathe, one 24-inch surface planer, twelve-inch jointer or buzz planer, one special motor head $11\frac{1}{2}''$ lathe, ten 11" wood turning lathes. This equipment represents an investment of over $4,000.

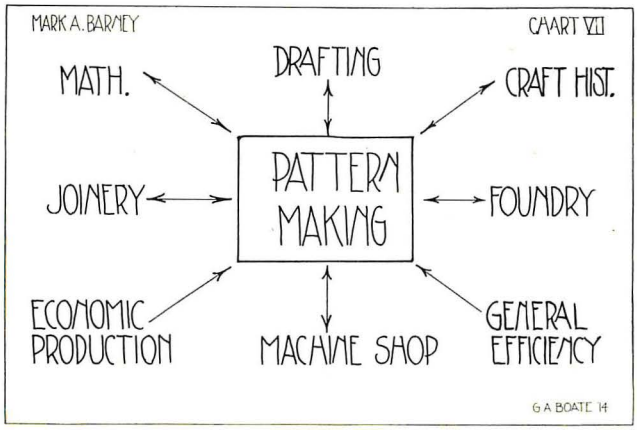


Chart VII.

Value of Course in Patternmaking.

(1) *Educational*:

(a) It insists upon accuracy of work, greater accuracy is required in patternmaking than in any other branch of woodwork. An error of 1/64 to 1/32 of an inch often makes a pattern worthless.

(b) The patternmaker must interpret the ideas of the draftsman and designer in producing in tangible form that which had previously existed only as a conception in the mind of the designer and expressed by means of working drawings.

(c) The patternmaking course is valuable as a means of mental discipline, because it presents problems to be solved with reference to a succession of circumstances and events which take place after the patternmaker's work is finished. He must understand many of the difficulties of the moulder and some of the operations of the machinist, and these difficulties and operations must be kept constantly in mind during the construction of the pattern.

(2) *Practical*:

(a) It is essential for any man engaged in industrial or technical work to understand how the ideas of the inventor and designer of machinery are produced in metal by the process of moulding and casting which requires the use of patterns.

(b) Patternmaking or an understanding of its principles is a vital factor in the art of machine construction.

(c) As long as machinery and mechanical devices continue to be developed, so long will there be a demand for patternmakers at a fair wage, from $15 to $35 per week. Of course as in all other things the amount of reimbursement which a patternmaker receives depends on the ability of the workman and the opportunity.

Distribution of Shop Time in Patternmaking.

600 hours equal one hundred per cent—See Chart No. VII.

First Year—

15 Per cent Hand tools use and care.

10 Per cent Band and jig saw, use, care and operation.

30 Per cent Planning and pattern layouts.
20 Per cent Simple pattern layouts.
5 Per cent Sandpapering and varnishing.
10 Per cent Simple two-part flask moulding.
5 Per cent Simple regular and irregular core working.
5 Per cent Shop talks.

Second Year—

10 Per cent Hand tools.
15 Per cent Band saw, jig saw, rip and cut-off saw, jointer surface planing.
10 Per cent Simple pattern construction.
10 Per cent Planning moulding of pattern.
15 Per cent Pattern layout.
5 Per cent Elements of efficiency.
10 Per cent Machinery of castings.
15 Per cent Moulding and core making.
5 Per cent Blueprint reading.
5 Per cent Shop talks.

Third Year—

25 per cent Hand tools and machine tools.
15 per cent Planning construction and moulding of patterns.
10 Per cent Pattern layout.
20 Per cent Advanced moulding and core working
10 Per cent Short cuts in machine operation.
10 Per cent General efficiency.
5 Per cent Cabinetmaking.
5 Per cent Shop talks.

Fourth Year—

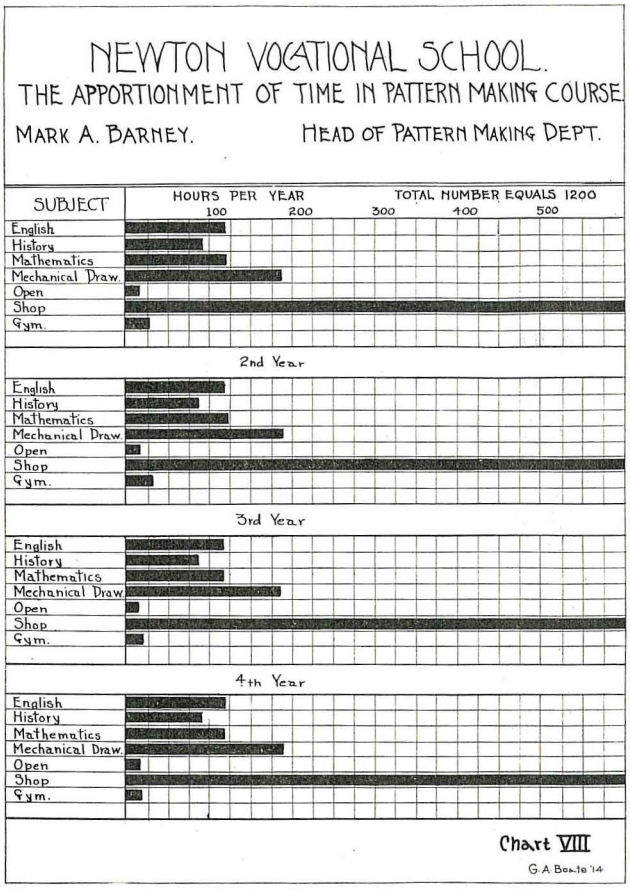
25 Per cent Hand tools and machines.
25 Per cent Complicated pattern work.
15 Per cent Complicated moulding.
10 Per cent Short cuts in machine operations.
10 Per cent Designing.
10 Per cent Efficiency.
5 Per cent Shop talks.

The "Whys" of Correlation in Pattern-Making as Indicated by Chart VIII.

The elements of differentiation in the machine construction trades make each trade more or less dependent upon the other. Therefore, academic subjects and closely related trade subjects must be correlated in order to obtain the maximum results.

(1) *Drafting*:

The pattern shop is dependent to a great extent upon the drafting room for drawings of machine parts which require castings. The drafting room receives help from the pattern-shop in checking measurements which can more easily be noticed in the concrete pattern form, as the pattern develops. The more the patternmaker and draftsman understand of each other's trade, the more efficient will be the results that can be obtained in these respective departments.



Distribution of Shop Time.

(2) *Machine Shop*:

The machine shop receives help from the pattern-shop in that the machine shop is dependent upon the pattern-shop and foundry for all cast metal machine parts. The patternmaker must allow extra metal on all parts to be machined, provide for the holding or chucking of irregular surfaces, also patterns of jigs and jig parts. The machine shop furnishes the indirect outlet for the pattern shop.

(3) *Foundry*:

The foundry must have forms providing exterior and interior surfaces in the moulds that are to be reproduced in metal. Such forms are made in the pattern-shop and are called patterns either solid, built up or swept, with the necessary core print provision if an exterior is desired.

(4) *Joinery*:

The patternmaker must have knowledge of and skill in the use of woodworking machinery. This knowledge is easily applied to either carpentry or cabinetmaking, should circumstances make it desirable to take up that work temporarily.

(5) *Mathematics*:

Mathematical problems are constantly arising during the construction of a pattern, such as combination of measurements, records of stock and hardware prices and discounts, time and material costs, power consumption, laying out of angular and curved

surfaces which necessitate arithmetical and geometrical calculations.

(6) *Economic Production*:

The present-day competition in industrial pursuits makes it imperative that pattern construction be so planned that a great many moulds and castings may be made from one pattern, with rapidity of production.

(7) *General Efficiency*:

A successful patternmaker must have good habits, be ambitious, reliable and accurate, able to concentrate, to bear responsibility and have a thoro knowledge of his trade.

(8) *Craft History*:

Not necessary, but desirable, in that a study of past and present endeavors and accomplishments ought to stimulate every patternmaker to greater achievements.

Chart No. VIII shows the proportionment of time in related and academic subjects. This chart will be analyzed more fully in the article on Machine Trade, which will occur in a later issue. Chart IX, or the master trade, is that of the third-year group of patternmakers. Individual trade record cards of the unit size $8\frac{1}{2}$x11 inches are kept for each boy. Chart No. IX merely shows the posted record of these cards, for one group of boys for one year.

POSTED 1914 1915 1916 1917

MASTER TRADE RECORD SHEET OF THE PATTERN MAKING DEPARTMENT

CLASS 1917

CHART IX

NEWTON VOCATIONAL SCHOOL ·· ·· NEWTONVILLE, MASS

GROUPS		OPERATIONS	NELSON J.	WOODWARD H.	COLLERAN W.	GUSTAFSON G.	WELLER F.	GRAY W.	MULLANEY J.	ORCHENIAN B.	BURNS P.T.	WHITE M.	BELBEN H.	HEFFERAN H.	HILSON T.
"A" PATTERN	1	1 PART	20		25	60		105	50	65		10	105	10	105
	2	2 PART	55	35	20	50		60	50	45		10	25	10	23
	3	3 PART								23					
	4	PLASTER PARIS													
	5	DRAW BACKS				20	5		10	3	15				
	6	CORE PTS. VER.	5			30	5	15	15	15	15	15	20	5	10
	7	" " HOR.	20		10	30	5	5	25		100	15	15	10	15
	8	" " BAL.				15		5	5		30				
	9	" " "BOOT JACK"				20					20	15	10		10
	10	ONE CASTING	50		5	20		10	15	10	55	5	13	5	60
	11	SEVERAL " s	55		10	10			20	15	55	5	20	5	10
	12	METAL & MASTER											5		5
	13	VARNISHING	13		15	35	10	30	45	35	25	15	25	20	10
	14	FILLETS	8		20	20	10	15	15	13	50	15	23	5	10
	15	MACH. FINISHED	5	50	10	40	5	15	15	40	70	13	15	5	20
	16	ASSESORIES	10			10	10				70	8	20	5	10
"B" CONSTRUCTION	1	SOLID	5	50	20	35				25					
	2	BUILT UP	45	25	15	30		15	10	10	70	10	105	5	105
	3	STAVES						60	15			15	60		60
	4	SEGMENTS	10		5	20	30			35		8			
	5	FLANGES						48	40	10	75	60			50
	6	WEB						30	5			8	5	5	10
	7	ARMS				55		30		25		5			5
	8	RIM				15	10	30	15	15	30				10
	9	MATERIAL			15	15		20		15		15			5
	10	THIN METAL	33	30	10		10			15	15		15	5	5
	11	STRENGTH	5		10	15	15	35		25		10	13		5
	12	DURABILITY	5		10	10		40					10	10	10
"C" MOULDING	1	FLASKS			5		15					10	5	10	10
	2	SAND, DRY & GREEN			5	20	20		15			10	15	10	10
	3	RAMMING			5		10	5	10	10		10	15	15	15
	4	CORE COMP.					5		10			5	5	13	10
	5	CORES REG			5	10	10	5	15			5	10	5	10
	6	CORES IRREG.			10	25	25		5			10	20	10	
	7	CORE BOXES	10		23	25	25		10	48	30	5	13	5	20
	8	CORES SWEPT						5	5		45		3	5	
	9	VENTING				10	10		5				5	5	5
	10	METAL			5	5	5			5		5	5	5	5
	11	" MOULDING				10	10	5	5			10	15	5	10
	12	" POURING			5	15	15	5	3			15	20	5	15
	13	SNAGGING										5	5	5	5
"D" HAND TOOLS	1	USE	105	120	105	105	25	100	5	135	85	55	55		100
	2	CARE	25	40	50	45	15	10		90	10	20	10		20
"E" POWER MACH'S	1	USE	105	130	50	120	30	100	25	100	100				100
	2	CARE	30	40	25	25	15	10		50	30				20
	3	SETTING UP	20	25	20	25	15	15		30	20				40
"F" SAWS HAND & POWER	1	SETTING			25	10									3
	2	SWEDGING			25										
	3	FILING			25	8					30				5

Master Trade Record Sheet.

After four years of training there will be four master trade record sheets, one for each year and a fifth sheet showing the summation of these four sheets. The boy's trade record card beside showing number of hours of training during the year, also shows the type of pattern, number of core boxes, classification, letter and number so that it is possible to go to the pattern storage room and pick out every pattern which a particular boy made during his period of training on commercial pattern-work. In order to gain an idea of the kind of work which may be found in a school pattern-shop, I will quote briefly from the record file of the pattern department: "clamp grinding fixture, bench grinder, guard for Norton grinder, belt sander, belt guard for Townsend wet tool grinder, pipe bender, 8″ speed lathe, Ames type bench lathe with fixtures, crank shaft jig, planer angle irons, groove pulley 12″, hand jointer, speed demonstrator, wall bracket gear box, 8″-10″-12″ brake pulleys, arbor press, power hack saw, friction clutch, 14″ lathe, brooching press, 10″ engine lathe with counter shaft, raising blocks for Bradford lathe, bench drill (power), 4″ bench shear, straightening press, screw jack, ½ H. P. 110 V. D. C. Motor, 1 H. P. D. C. motor, disc grinder, Stark bench miller, profile machine, electric elevator drive, jig saw, bench legs and metal drawer, yoke for power ice cream freezer, automobile engine pistons, intake manifold and adjustable steering wheel." Some of the machines mentioned have from ten to 30 patterns each. The preceding are only a few of many and show to a slight extent the variety of the work.

Acknowledgment is here made to Mr. Mark A. Barney, head of the Patternmaking Dept., who is responsible for the building of this course; for his assistance and co-operation while making this study, also for material and data for charts contained herein.

UNIT COURSES IN HOUSEHOLD SCIENCE FOR MONTCLAIR HOUSEWIVES AND MAIDS

Sarah Helen Bridge, Glen Ridge, N. J.

IN the fall of 1913 a request came to the Montclair, N. J., school authorities from a group of housewives for courses in household science. After due consideration the authorities responded, and suggestions as to the needs of these housewives were gladly received by the instructors of household science. Unit courses of ten to twelve lessons in various branches of household science, such as "flour mixtures," "chemistry of food," "household routine," "salads and desserts," and "marketing," were offered. A description of the courses offered was published in the local newspapers and dodgers, as follows, were distributed by the school children:

Unit Courses in Domestic Science.

Mondays.....	Mount Hebron 4:15 Dom. Sci. Room	Marketing with practical work in cooking.
	Central School 4:15 Dom. Sci. Room	Chemistry of foods with menus. Cost for course $1.00.
Tuesdays.....	Central School 3:30 Dom. Sci. Room	Marketing with practical work in cooking.
	Central School 7:30 Dom. Sci. Room	Salads and desserts. Cost for course, $4.00.
Wednesdays...	Central School 3:30 Dom. Sci. Room	Theory of marketing and fireless cooker, $1.00.
	Central School 3:30 Dom. Sci. Room	Salads and desserts. Cost for course, $4.00.
Thursdays.....	Central School 3:30 Dom. Sci. Room	Bread and Rolls. Cost for course, $1.00.
Fridays.....	Central School 3:30 Dom. Sci. Room	Household routine. Cost for course, $1.00.

First lesson Thursday, Jan. 22nd.

Note.—In order to enable us to buy materials, the fee for the course should be paid at the first lesson.

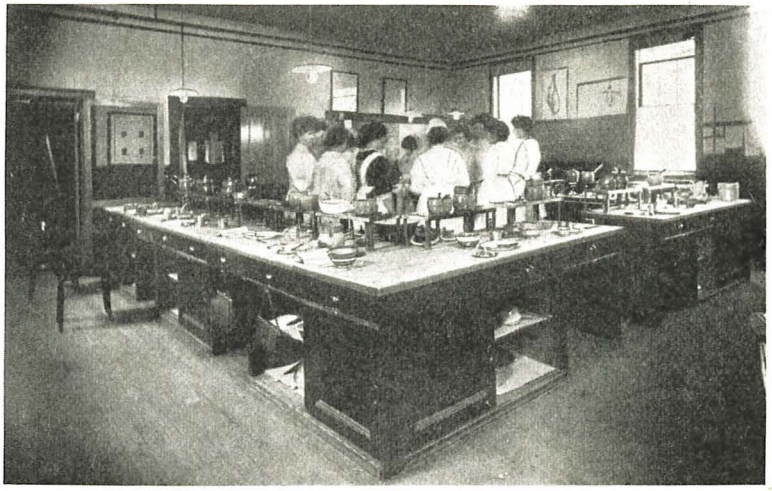
The subject matter of the "Flour Mixture" course was outlined as follows:

I. Flour mixtures—
   Baking powder prepared.
   Griddle cakes, popovers.
   Methods of mixing batters, doughs.
   Difference between pastry and bread flour.
   Home made baking powder.
II. Waffles—plain muffins, corn muffins, whole wheat muffins.
III. Atlanta pone — (Southern corn bread), Boston brown bread, tea and nut bread.
IV. Dutch apple cake, baking powder biscuit, egg rolls, rock buns, boiled coffee.
V. Yeast (leavening agent), buckwheat cakes, raised waffles, muffins, grilled muffins.
VI. Parker House rolls, salad or dinner rolls, Swedish rolls, coffee. Cinnamon buns and bread sticks.
VII. Plain rolls, hot chocolate, bread into small loaves.
VIII. Pastry, pie and patte shells.
IX. Cookies, Boston filled, tea and punch.
X. Cake, plain, uncooked filling. Sponge cake, hot chocolate with cream.

The course in "Chemistry of Food" was devoted to the development of the five food principles, i. e., water, carbohydrates, fat, protein, and mineral matter, emphasis being placed on the calorific or heat giving value and tissue building value of foods used in planning daily menus.

Approximately one hundred and fifty (150) housewives registered. A nominal fee to cover the

expense of food materials, charts, pamphlets, etc., was charged. The classes were conducted in the various school kitchens at hours during the day when the kitchens were not being used by the school children. There were also classes in the evenings. Each class in actual cooking was limited to twenty members, while the lecture courses averaged 30 members. The classes met once a week for ten or twelve consecutive weeks. The cooking classes were scheduled for a two-hour weekly period and the lecture courses for a one-hour weekly period. The first year the classes were open to all Montclair women, regardless of experience or any previous study in household science. Note-taking and home study for the classes in theory were requested. The recipes for the classes in cooking were typewritten and distributed at the beginning of each lesson. The lecture work in the classes in marketing was supplemented by visits to the local markets with the instructor.



Montclair Unit Course—A Class of Housewives in Session.

The second year, 1914-1915, unit courses were established for the maids of Montclair as well as for the housewives. These classes were held Thursday afternoons and in the evenings. The courses consisted of elementary and advanced cooking, serving, and the care of the kitchen, pantry, and dining room. The same plan of advertising was followed, the same fees were asked, and the weekly program was the same as that of the housewives.

Insofar as was possible, the courses for the housewives during the second year, were graded according to ability and previous training of the applicant. More advanced courses were offered for those members who had done creditable work the previous year. Courses in fancy pastries, entrees, and more elaborate desserts were given. The elementary courses were also conducted to meet the requirements of new members. The members of the Chemistry of Food class, who had obtained a satisfactory theoretical knowledge of the value of the various foods, went on with laboratory work. They weighed and measured 100 calorie portions of food, comparing and analyzing them, and computing their cost. The actual computing, measuring, weighing, and preparing of balanced menus, meeting the requirements of the families of the class, gave the members a working knowledge of what kinds and quantities of foods to use in their homes.

The third year, 1915-1916, unit courses were advertised for both the housewives and the maids. Elementary, intermediate, and advanced courses for both were offered, fitting the needs of the community as far as possible. The courses followed in sequence and necessary prerequisites were required for admission to the more advanced classes. Certificates stating the time spent and the kind of work accomplished, were given to the members of the maids' classes for each unit course completed satisfactorily.

Board of Education

Montclair, N. J.

Domestic Science Department

This is to certify that .....

has completed unit course .....

Grade .....

..... Teacher

Certificate Issued to Adult Students of Unit Course.

Thus a form of extension teaching in household science for the betterment of the domestic life of the Montclair community has been established. Other communities are rapidly adopting this progressive movement. Not only have these courses served as a source of scientific knowledge for the housewives and maids of Montclair but they have been a stimulus for prospective housekeepers as well as a source of new, practical ideas for the mothers who have not had time or opportunity to attend institutes and schools of household science. Perhaps one of the most worth-while results of this new work is the enthusiasm and desire on the part of the more intelligent maids to make themselves more proficient in their work, as testified to by their mistresses. It has been hoped that this would be a step toward the standardization of wages for maids.

These unit courses are under state supervision, and under the head of Vocational Training. Further information as to the means of conducting unit courses in household science may be obtained upon application.

ORGANIZATION OF TEACHING MATERIAL

A SUPERVISOR'S OUTLINE

F. D. Crawshaw, University of Wisconsin, Madison, Wis.

IN previous numbers of this Magazine, the writer presented three types of supervisors' outlines illustrating one problem in the organization of teaching material. The suggestions for courses in industrial arts which these outlines contained have brought the request for outlines in other subjects. The present outline for drawing in the grades is published, therefore, as much for its content value as for the purpose of illustrating further types for which the supervisor is responsible.

It should be added that the outline on drawing, like all the preceding outlines, is one which has been used for a number of years and is not a theoretical or projected scheme for drawing in the grades but is, rather, the result of practical, tested teaching experience.

Several years ago a group of teachers in Peoria, Illinois, formed themselves into a school-craft club. The writer was made chairman of the group, which decided to make a study of the courses in drawing in the grades in different cities of the United States. As a result of this study it was found that while many supervisors professed to teach mechanical drawing in conjunction with the well established work in freehand drawing, in reality almost nothing was done in mechanical drawing which was consecutive from grade to grade, which was associated with the simultaneous construction work or which could be closely correlated with the freehand drawing. The club then developed an outline in mechanical drawing which is the basis of the present outline and which as the result of several years' use, under public school conditions, has undergone slight but not radical changes.

In order to execute the scheme of uniting freehand and mechanical drawing with design and construction, Prof. W. H. Varnum, with the writer, developed the outline in freehand drawing and design for the grades to parallel the outline in mechanical drawing. It has been given the test of school practice. Neither outline is a complete course of study. The attempt has been made by a few drawings and an abbreviated text to suggest the sequence, correlation and technical possibilities of drawing and handwork in the grades. The drawings are typical only of the processes suggested for the corresponding grade.

It is a well established fact that construction work in the lower grades may be carried on as a means of expression by which each pupil will develop in concrete material his or her own ideas. This early industrial work may also be taught to acquaint the pupil with industrial materials and to develop in him some degree of technique and skill in the handling of these materials.

The outlines in drawing do not suggest that an expressional type of work should or should not be done. They do suggest, however, some possibilities of technical accomplishment in drawing. Whether the pupil initiates and expresses himself freely in handwork or not, a sequence of principles in drawing and construction should be established and each individual should secure technical results comparable with his own understanding and ability.

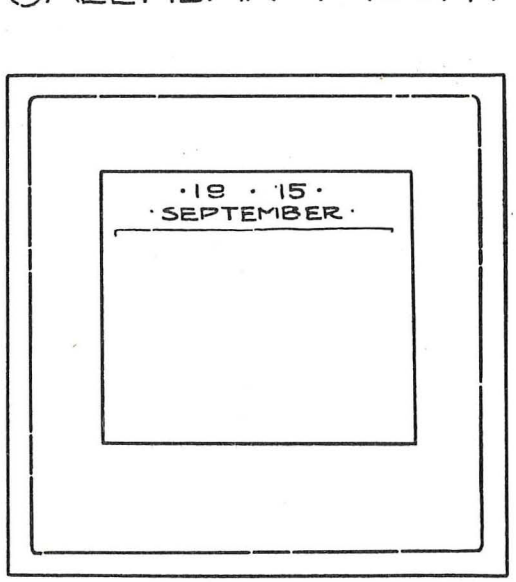
OUTLINE FOR DRAWING IN THE GRADES.

Correlation Shown Between Freehand and Mechanical.

First Grade.

Mechanical—

Subject Matter: The square and its foldings. Fold principally but draw necessary lines with lead pencil and ruler. Cut sparingly with scissors. Use softly tinted, accurately cut six-inch squares.



Grade I—Example of Mechanical Drawing.

Teach: Square, center, diagonals, opposite side, parallel, measuring in from sides at two points and connecting points with straight edge and pencil. Fold on line and against ruler.

Method: Dictation at first from completed object. Use development method early, viz: ask questions, agree upon what to do but not always *how* to do.

Tools: Lead pencil, ruler graduated to one-half inches, blunt pointed scissors, punch.

Models: Wind mill. Square envelope, square tray. Book corner. Book mark. Simple furniture made from square. Square woven mat.

Freehand and Design—

Subject Matter: Subdivisions of a square along its center lines and diagonals. Divide a square into four sections along its center lines or diagonals. Introduce a smaller and corresponding square in the center. Motive

to be straight line, geometrical repeat or simple freehand convention, supplied from simple flower, seedpod or other natural form.

Teach: Square, center, parallel, diagonal.

Method: Dictation of the square and its simple parts. Developmental for formation of center square. Determine convention for pattern by observation of specimen natural forms. Freehand ruling and pattern duplication.

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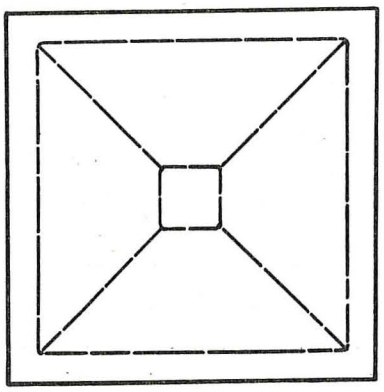


Grade I—Example of Mechanical Drawing.

Tools: H. B. lead pencil and simple color crayon box.

Models: Straight lines in simple geometrical forms. Simple flower with four petals and a fairly large center.

Second Grade.

Mechanical—

Subject Matter: The oblong, its foldings and divisions formed by lines parallel to edges of oblong. Simple 45-degree corner lines. Use both plain and co-ordinate paper graduated to one-half inch. Plain paper has one square corner.

Teach: Oblong and parts as compared with square. Fold against edge of ruler. Crease with end of scissors leg. Complete square or oblong by measuring across from straight edges adjacent to square corner.

Method: Dictation only upon new types and operations. Extend development method to acceptance of class decisions to some extent. Use completed object and perspective drawing of same for illustrative material.

Tools: Lead pencil, ruler graduated to one-fourth inches. Scissors with one blunt and one sharp point. Punch and paste.

Models: Book mark. Calendar mount. Simple rectangular tray. Grocery list pad. Simplest folded booklet. Simple rectangular envelope and furniture. Rug loom.

Freehand and Design—

Subject Matter: Observational drawing of familiar rectangular objects. Designing simple oblong forms. Free movement and good pencil holding. Proportions studied from good examples. Enrichment as in *first grade,* applying motive to new form.

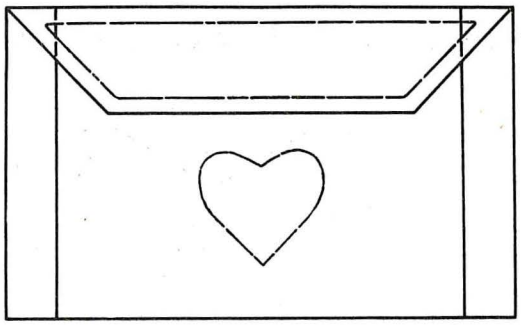
Teach: Salient points in observation. Correct method of holding pencil. Soft lines. Free arm movement. Criticism of sketch to "look like" the object.

Method: Observe and draw with child. Give child unhampered opportunity to draw as he thinks he sees. Criticise after demonstration of his observation. Have additional sketches made to increase power of observation and to improve technique.

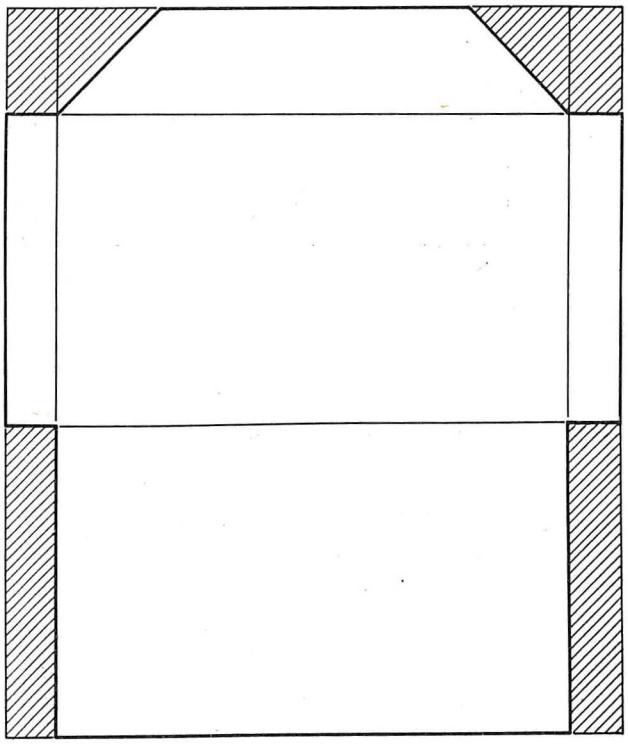
Tools: H. B. pencil, manila paper and colored crayons.

Models: (to draw) Children's toys. Objects about the schoolroom.

(To design) Those in Second Grade mechanical drawing list.



PAPER ENVELOPE PATTERN



Grade II—Example of Mechanical Drawing and Design.

Mechanical— Third Grade.

Subject Matter: The triangle (equilateral) and simple facts concerning it. The circle and simpler parts. Make with circle finder. Use plain and co-ordinate paper graduated to one-fourth inches. Plain paper has one straight edge.

Teach: Triangle and circle and names of simpler parts. How to use circle finder and determine triangle in circle with same. Relation of triangle to hexagon. Consecutive measurements.

Method: Necessary dictation. Class development and individual initiative. Use model and perspective drawing. Develop working, orthographic sketch from perspective and model.

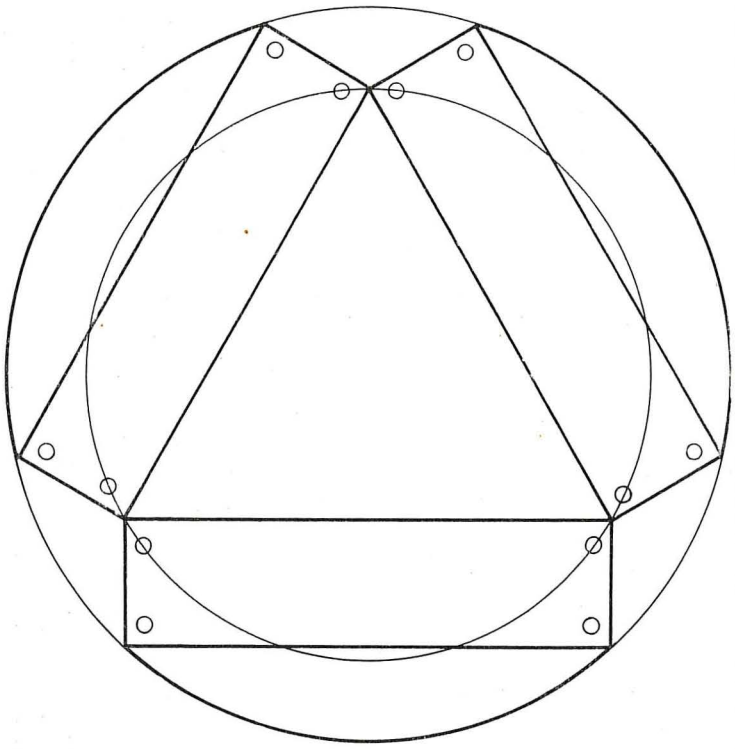
Tools: Lead pencil, ruler graduated to one-eighth inches, scissors with two sharp points, punch, circle finder, paste.

Models: Triangular tray, tied and pasted corners, vertical and flaring sides. Double triangle for star. Kite. Cornucopia. Penwiper made of circular discs. Circular picture frame. Hammock loom. Tam O'Shanter loom. Desk pad corner. Furniture.

Freehand and Design:

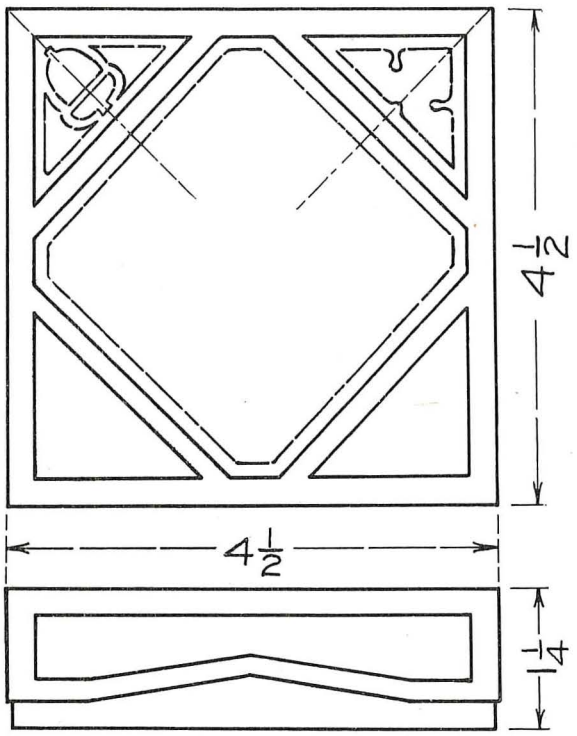
Subject Matter: Drawing curvilinear objects based upon transportation. Discussion of streets and parks in business

CIRCULAR—TRIANGULAR TRAY



Grade III—Example of Mechanical Drawing.

PAPER BOX



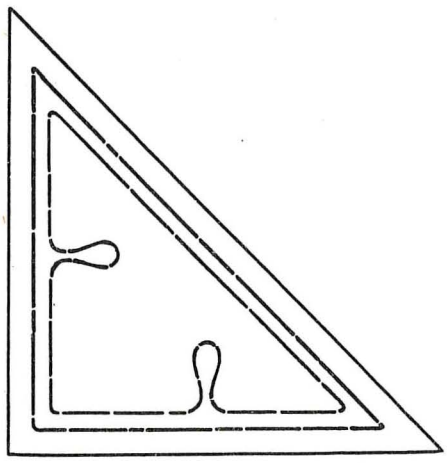
Grade IV—Example of Mechanical Drawing and Design.

and residence sections, introducing triangular and circular plots of ground at common junction points. Plotting same.

Teach: Appearance of the circle as seen in common objects. The objects are to be placed in foreshortened positions. Drawing of circle and ellipse. All theory omitted.

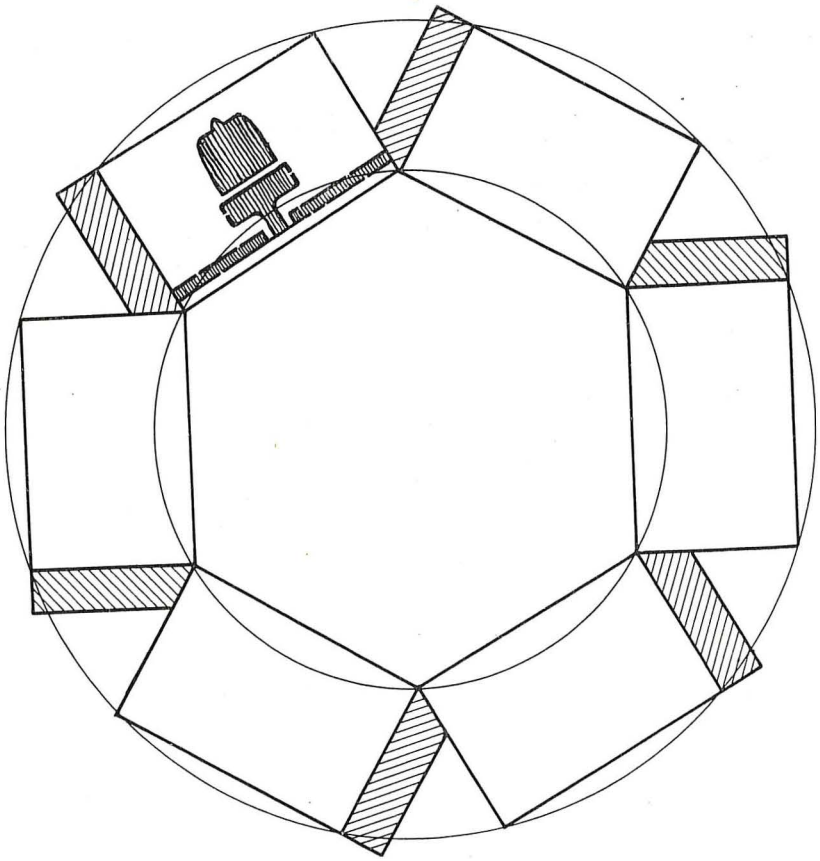
Method: Stimulate interest by discussion of various transportations. Free illustration of street scene in crayon following observation of streets and parks and drawing of same. Intensive observational study of circular objects at different levels, to be followed by teacher's criticism of drawings.

BLOTTER CORNER



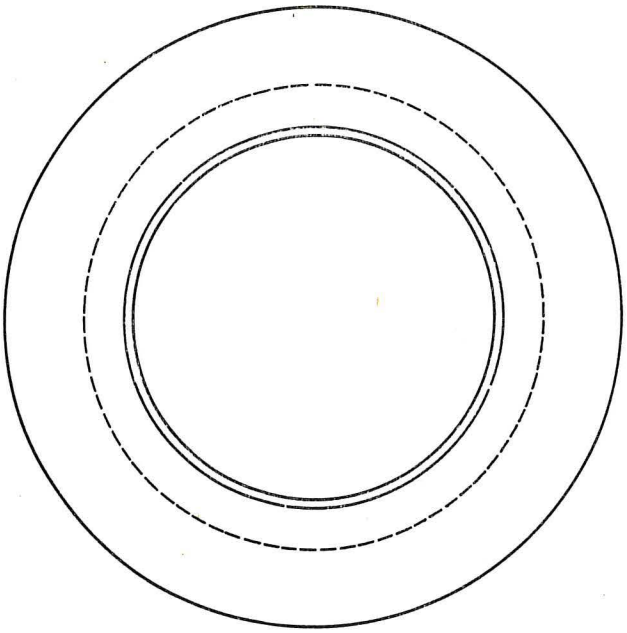
Grade III—Example of Mechanical Drawing and Design.

PATTERN FOR HEXAGONAL BOX



Grade IV—Example of Mechanical Drawing and Design.

CIRCULAR PICTURE FRAME



Grade III—Example of Mechanical Drawing.

Tools: H. B. pencil, manila paper, crayons and pan water-color set.

Models: Transportation models: Toy wheelbarrow, buggy, etc. Baskets. Measures. Maps. See, also, models under "mechanical" for Third Grade.

Mechanical— **Fourth Grade.**

Subject Matter: Complete square or oblong from paper with one straight edge. Use of triangle against edge of ruler to erect perpendicular. All simple polygons. Box forms with covers. Semi-complex envelope patterns. Use plain paper only. Use of compass for first time.

Teach: Use of compass and triangles to bisect and erect perpendiculars. Use model sparingly. Use working orthographic sketch interpreted by perspective or model. Simple pattern developments.

Method: Necessary dictation. Individual initiative. Simplest calculations for patterns. Estimate patterns principally by unfolding objects.

Tools: Lead pencil, ruler graduated to one-sixteenth inches, scissors with two sharp points, compass, triangles, sloyd knife, paste.

Models: Six-pointed star in combination with circle and arcs. Boxes with covers (simpler polygon forms). Waste basket (laced corners). Envelopes. Simple portfolio. Desk pad with corners. Two dimensioned drawings of projects in clay and wood, such as tiles and whittled objects.

Freehand and Design—

Subject Matter: Still life study of simple flower and other possible design elements from nature. Conventionalizing for bilateral arrangement. Arrangement about structural axis. Conventional unit for body of border design in stencil.

Teach: Bisecting a given space and balancing the conventionalized unit on the bisected line. Proper adjustment from bottom and top of space. Monochromatic tinting. Principles of design applied.

Method: Necessary dictation to secure appropriate design unit and relate it to space in shape, character, etc. Developmental in determining conventional design units, bringing out individual initiative. Use of crayon and water color in harmonious monotones.

Tools: H. B. lead pencil, manila and tracing paper, crayons and color box.

Models: Simple and well articulated flower and other natural forms connected with the use of the portfolio and other articles made in school and home activities.

(*To be concluded*).

PRIMARY CONSTRUCTION

Edward F. Worst, Director of Elementary Manual Training and Construction Work, Chicago

JANUARY.

Construction for First Grade.

Learning to Measure.

The pupils have already had numerous lessons in constructing boxes, envelopes, baskets, etc., without the use of the ruler as a measure. In a few cases, the ruler has been used as a straight edge in ruling certain lines, but no exercise calling for definite measurements in inches has, up to this time, been mentioned.

In the comparison of objects made and handled, the pupils should now be familiar with such words of comparison as taller, shorter, higher, lower, tallest, shortest, highest, lowest, larger, smaller, longer, largest, smallest, longest, nearer, nearest, wider, and widest.

The Foot Rule.

The first-grade child should not be allowed to handle a ruler marked off into divisions smaller than the inch. Rulers marked off in inches are kept in stock by school supply dealers. The fact that beginning ruler-work is dreaded by most teachers is due to the fact that poor rulers and rulers marked off into the smallest divisions are put into the hands of the beginners, thus making the work very confusing.

Pass to each child a foot-rule. Hold up your rulers to see if they are all the same length. Have several pupils lay their rulers together until they are satisfied that all are of the same length.

Each ruler is one foot long.

Cut a strip of paper one foot long.

With your ruler draw on the blackboard a line one foot long. Erase. Now draw on the board a line one foot long, without the ruler. Measure with the ruler to see if the line is just one foot long.

Look about the room to see if you can find anything about one foot long.

At the close of a lesson like the above, the pupils should be familiar with the following written words: One foot; 1 foot; foot-rule.

Stand against the blackboard. Make a mark on the board even with the top of your head.

With a piece of string, measure from the floor to this mark. Pin the string to the floor. Place on it foot-rulers, end to end. How many rulers do you need to cover the string from pin to pin?

The string is how many foot-rules long? Now measure it with only one ruler. Place the ruler on the string, and make a mark at the end of it. From this mark, measure the length of the ruler and make another mark at the end of it. Mark off all the string in this way. How many feet long is it? About how tall are you?

Without using the ruler, place on the board a line two feet long. Measure with your ruler to see if the line is two feet long. Without using the ruler, draw a line three feet long. Measure to see if the line is three feet long. With the use of the ruler, make the line just three feet long.

One foot and one foot and one foot are————feet.

Using your ruler, erase two feet of the line. Measure the part which is left. How long is it?

Three feet less two feet is————foot.

Two feet and one foot are————feet.

With your ruler, draw a two-foot line. Draw another two-foot line. How many feet are there in both lines?

Two two-foot lines are ————feet long.

Using the ruler, draw a line three feet long. Draw another line one foot long. How many feet are there in both lines?

Three feet and one foot are————feet.

Four feet less three feet is————feet.

Have the pupils measure objects in the room.

How many feet long do you think the teacher's desk is? Measure to see if you are right. How wide do you think it is? Measure to see if you are right. How wide do you think your own desk is? Measure to see how nearly right you are. How high do you think it is? Measure to see if your are right.

Which do you think is the wider, the door or the window? Measure to see which is the wider. How many feet do you think it is from the floor to the blackboard? Measure.

How long do you think the teacher's pointer is? Measure.

With a piece of chalk in each hand, stretch your arms as far apart as you can, and make two marks on the board. Measure the distance between the marks on the board to see how far apart you can stretch your hands.

The Inch.

To teach the inch, borrow the colored sticks provided the second-grade pupils.

Place on each child's desk a blue stick *one inch long.* Tell them that each stick is just *one inch long.* Show an inch on your foot-rule. Cut a strip of paper one inch long.

For the cutting of paper strips of various lengths, use the strips of bogus bristol board, such as was used for double weaving in the second grades. By having a uniform width, the pupils have only the length to consider in the paper strip cutting.

Place on the desk of each child a red stick two inches long, a green stick three inches long, a yellow stick four inches long, an orange stick five inches long, and a purple stick six inches long.

With the one-inch strip of paper, find how long the red stick is, the green stick, the yellow stock, the orange stick, the purple.

Cut a strip of paper two inches long. Cut another three inches, another four inches, another five inches.

Put the four-inch strip and the two-inch strip end to end. Count the inches in both strips. How many inches? Now make six inches by putting end to end the one-inch strip and the————inch strip.

Cut a strip of paper six inches long. Measure it with the two-inch strip. How many two inches make six inches?

Measure the six-inch strip with the three-inch strip. How many three inches make six inches?

Cut strips of paper from one to six inches in length, and paste in order from one to six inches.

Measure the foot-rule with the six-inch strip. How many six inches make one foot?

Measure the ruler with the two-inch strip of paper. How many two inches make one foot?

Measure in like manner with the four-inch and the three-inch strips.

Count the inches on the ruler.

On a 6″x9″ piece of drawing paper have the pupils draw lines from one to six inches in length, drawing them in the same order as the strips of paper were pasted.

Such an exercise should be followed by a series of questions similar to the following:

How many two-inch lines may be made from the four-inch line?

How many may be made from the six-inch line?

How many of the three-inch lines may be made from the six-inch line?

The four-inch line is how much longer than the three-inch line?

The three-inch line is how much longer than the two-inch line?

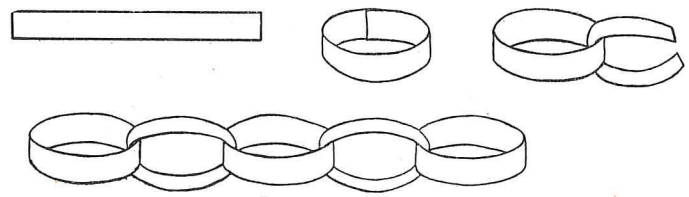
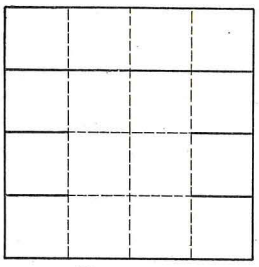


Fig 1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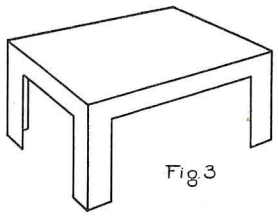
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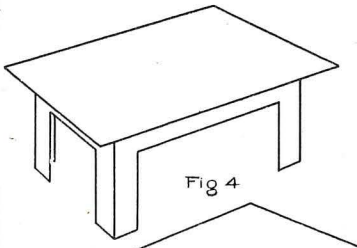
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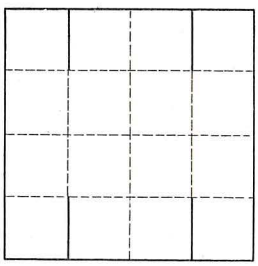
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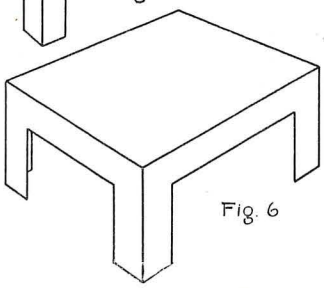
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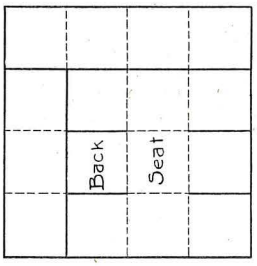

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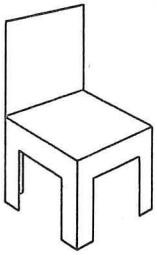
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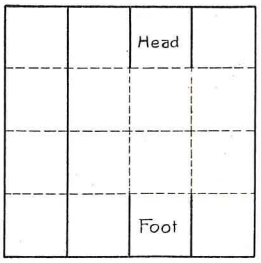
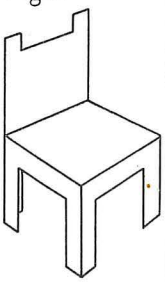


Fig 9



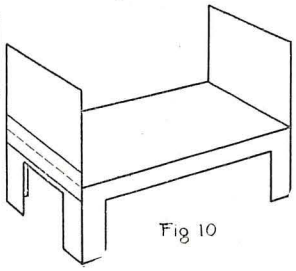
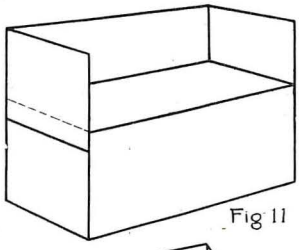


Fig 10

First Grade.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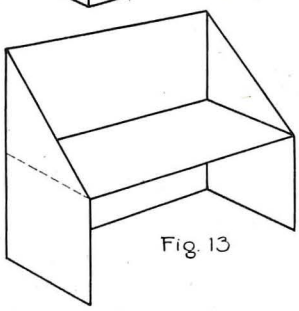
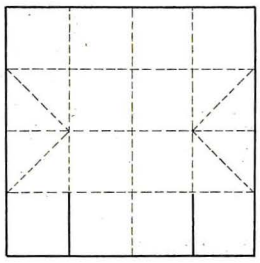


Fig. 13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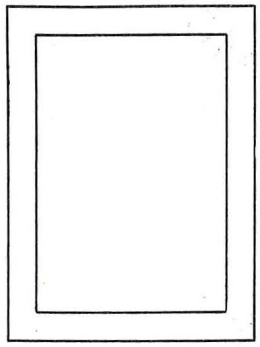
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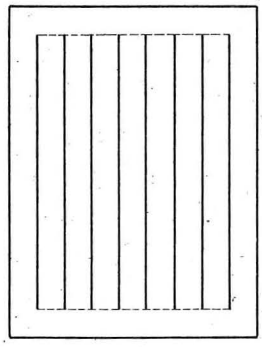


Fig. 15

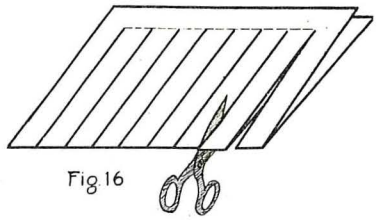


Fig 16

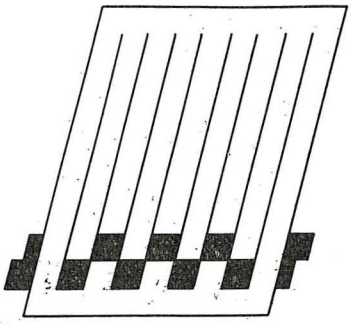


Fig 17

First Grade.

To determine the above, it will often be necessary to refer to the strips of paper or the colored sticks.

Making Decorative Chains.

There is nothing especially new in the construction of decorative chains. In the past, the chains have been made of strips cut by the teachers, the pupils doing the pasting only.

Since the introduction of the ruler, the strips for the chain should be measured by the pupils.

Pass to each child two pieces of tinted construction paper, of different tints, each 4½″wide and 9″ long.

Place the ruler along the long edges of the paper and place dots one inch apart. Connect the corresponding dots by straight lines. Cut along the lines just drawn, thus making one-inch strips. If narrower strips are desired, fold each one-inch strip lengthwise. Cut along crease, making half-inch strips. Paste as shown in Fig. 1.

The Doll House.

The work for the next two months will be largely based on the furnishing of the doll house. Many of the exercises will be a combination of measuring and folding.

Purpose:

To give the pupils practical use of the foot-rule.

To give the pupils opportunity of acquiring number facts thru the sense of touch, not depending entirely on sight and memory.

For example: Five inches means much more to the child after he has drawn a line or cut a strip of paper, or performed some other action involving the use of five inches, than if he simply hears and sees five inches. He has gained five thru another of the senses,—that of touch.

To give delightful occupation to the child. Is there anything that the child revels in, more than when making something? And can there possibly be a better time to teach practical number, oral and written language, than during these periods of construction?

Do not wait until the room can be furnished with a beautifully constructed doll house but go to the neighboring grocery and ask for two orange or lemon crates. Place one upon the other so the open sides face the room and you have a good foundation for a doll house of four rooms.

If at all convenient have each pupil construct his own doll house by pasting one 12″x18″ and two 9″x12″ sheets of drawing paper together. This is done in such a way that the 12″x18″ piece of drawing paper forms the back of the room and the 9″x12″ piece the sides.

When not in use the three pieces may be folded flat. When the pupils wish to use the room the sides may be unfolded from the back and the three walls are in an erect position.

Such an arrangement may cause a certain amount of confusion to the casual observer, but the educative value and the joy it brings to the child far surpasses any seeming confusion. Each child feels more responsible when he has his own one-room house than if he works with the whole room.

Making a Table.

Pass to each child a 9″x12″ piece of tinted construction paper. Place the ruler along the 12″ edges and mark off 9″. Connect the corresponding dots by a straight line. Cut along this line, and a 9″ square remains. Fold this 9″ square into sixteen small squares, as shown in Fig. 2.

Review the number.

Cut all continuous lines as shown in Fig. 2. Fold and paste into box shape.

It is well to do the pasting one day and the cutting of the legs the day following. If the cutting is done before the paste is dry, considerable difficulty is experienced in having the different parts come apart.

In cutting, it is a little difficult to have the pupils measure the length of the legs. Have the pupils cut free-hand about two-thirds of the distance from the edge to the bottom of the box. Do this on each side, leaving only the width of the legs. Fold the edge upward and crease. This crease will guide the pupils in cutting away the paper necessary, leaving only the narrow strip just below the edges of the table. Fig. 3.

If the extended top is desired, have the pupils cut a rectangle 4″ wide and 6″ long, and paste to top of table as shown in Fig. 4.

Another interesting way to make a table is to fold a 9″

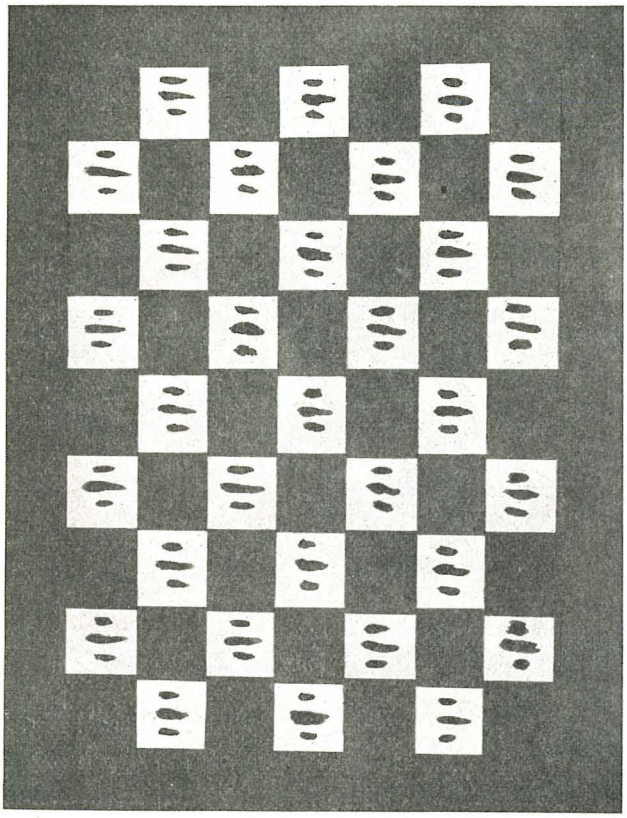


Fig. 18. First Grade.

square into sixteen small squares. Fold, cut, and paste into box form as shown in Fig. 5. Cut legs as in Fig. 3.

This gives the finished tables as shown in Fig. 6. It is larger than the others, but not so high.

After completing the table, have the pupils cut from any soft white paper the table cloth and napkins. Keep the measurements in whole inches.

Making a Chair.

Pass to each pupil a 9″x12″ piece of tinted construction paper.

Place the ruler along the long edges and mark off 3 inches. Connect the dots by straight lines. Cut along the line.

Fold the 9″ square into sixteen small squares. Review number work in the construction of the chair as suggested in box for shoe pegs, September outline. Cut as shown in Fig. 7.

Fold and paste into box form, allowing the square marked "back" in Fig. 7 to extend upward. After the paste has dried, cut legs in a similar way as for the table, Fig. 8.

To strengthen the back, paste one of the squares cut away across the back.

Making a Bed.

Measure, cut and fold square as when making the table. Before applying paste, let the squares marked "head" and "foot" (Fig. 9) extend upward. Paste a strip of paper across head and foot of bed, as shown in Fig. 10.

Cut legs of bed the same as those of table. To make the bed lower, cut a small piece from each leg.

A larger bed may be made if the 9″ square is folded and cut as shown in Fig. 5.

Making a Davenport.

Measure and cut 9″ square as in former exercises. Fig. 2 shows folding. Cut and paste in box form. Paste strip cut away to form back and sides of davenport. Fig. 11. This makes the simplest kind of a davenport.

Fig. 12 shows the folding of a davenport which may be made in one piece. It will be remembered that all dotted lines are to be folded and all continuous lines cut. Fig. 13 shows the finished davenport.

During the month of November, suggestions were given for the construction of a cradle. This may again be constructed on a smaller scale, to be used in the furnishing of the house. It must be remembered that all this doll-house furniture must be in good proportion. The chair cannot be as large as the table, nor the cradle as large as the bed. When using each by itself, the size is not taken into consideration, but when the various pieces are used together, the size plays a very important part.

Weaving a Mat.

The first covering for the floors may be woven of strips of tinted construction paper one inch wide. Care should be exercised in having the pupils use good combinations of color.

The dimensions of the mat will be determined by the size of the kitchen floor, altho it is not necessary that the entire floor be covered by the mat. If a 9″x12″ piece of tinted construction paper is large enough, proceed to make the mat as follows:

One inch from each corner on the edges of the paper, place dots. Lay the ruler across corresponding dots and draw lines one inch from one edge to one inch from the opposite edge. Fig. 14.

Place dots one inch apart on upper and lower lines, and connect corresponding dots by straight lines. Fig. 15.

Fold edges together as shown in Fig. 16, and cut to line above. Unfold, and the foundation part of mat is finished.

Pass to each pupil another sheet of 9″x12″ tinted construction paper of a different tint. Place the ruler along the long edges and place dots one inch apart. Connect corresponding dots by straight lines. Cut into one-inch strips by following lines drawn. Weave these strips into foundation mat as shown in Fig. 17.

With brush and color, or with a colored crayon, make a design in the light squares of the mat. Use only straight lines. The design should be the same color as the dark squares.

If the mat, when finished, is given a coat of shellac or varnish, it makes a better floor covering and is made to look like linoleum. (Fig. 18.)

Envelope for Alphabet Matching Game.

Fig. 19 shows an alphabet matching card. In preparing the game, first cut on the vertical lines separating the two sets of alphabets. This gives two long, narrow strips, on which is found the entire alphabet in both capitals and small letters. The second set of alphabets has the words attached to it. Cut on the horizontal lines only.

This gives as many strips as there are letters in the alphabet, each strip having on it a capital letter, a small letter, and three words beginning with a particular letter.

The game is first played by matching each letter of the alphabet with the three words attached with each letter of the alphabet on the long, narrow strips. When the pupils can do this with a fair degree of rapidity, the words may be separated by cutting on the vertical lines. The pupils now match in the same way as before, by placing each word, instead of a strip containing all the words, in the proper place.

It has already been suggested several times, that pupils be taught, in all lines of seat work, to place each letter, word,

A a	A a	am	and	are	N n	N n	no	not	nest
B b	B b	baby	ball	big	O o	O o	out	one	of
C c	C c	can	clap	cow	P p	P p	play	pet	paw
D d	D d	do	dog	duck	Q q	Q q	quack	quick	quail
E e	E e	ever	every	eat	R r	R r	run	rabbit	ran
F f	F f	fat	feed	funny	S s	S s	see	skip	so
G g	G g	good	girls	go	T t	T t	to	trick	tail
H h	H h	hop	hand	her	U u	U u	up	under	up
I i	I i	is	it	in	V v	V v	very	very	very
J j	J j	jolly	just	jump	W w	W w	why	way	we
K k	K k	kick	kid	kitten	X x	X x	Xx	Xx	Xx
L l	L l	little	love	lap	Y y	Y y	yes	you	your
M m	M m	morning	my	may	Z z	Z z	Zz	Zz	Zz

Fig. 19. First Grade.

or counting material as it is picked up, and not to spend several minutes, or even sometimes a whole period, looking for a certain letter or word.

From material furnished, construct an envelope that will hold all parts of the game.

JANUARY.

Construction Work for Second Grade.

The Doll House.

There is no line of work that affords so great an opportunity for real, genuine number and language, both oral and written, as the construction of furniture for the doll house.

If the room is not furnished with a doll house, set aside a window sill or a table which may be appropriated for this purpose.

If the teacher is sufficiently interested, she may get a couple of orange or lemon crates for the asking.

Place one upon the other, so that the open sides face the rooms and you have a good foundation for a doll house of four rooms. A little stiff paper placed around the sides makes it possible to paper the rooms and thus carry out a different color scheme for each room.

It is true that only one doll house is being furnished in the schoolroom, but somewhere in the homes, there might be found as many doll houses as there are children in the room. There are few teachers who do not appreciate the value of construction to the children. Most teachers know so well the purpose of this work that they are able to defend it when it is criticised by those who do not know of its value, and who are inclined to look upon it as mere play.

The work in the first grade is a combination of measuring and folding. The work of the second grade should largely be measuring.

Purpose:

To begin to create an interest in the care of the home.

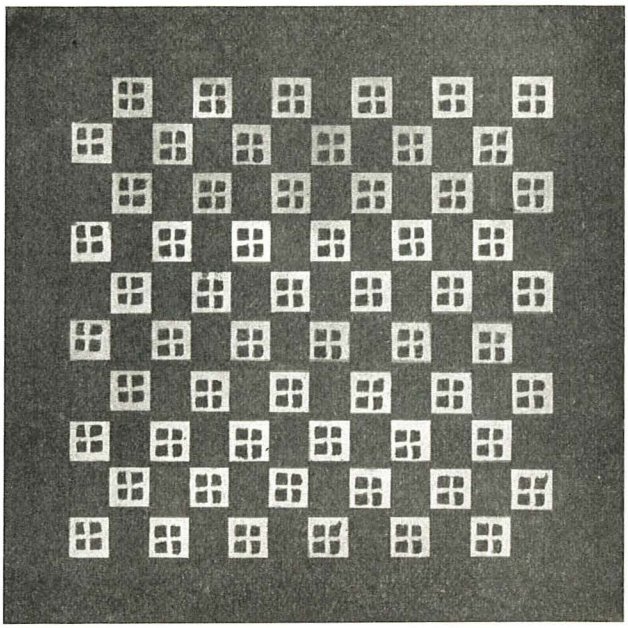


Fig. 4. Second Grade.

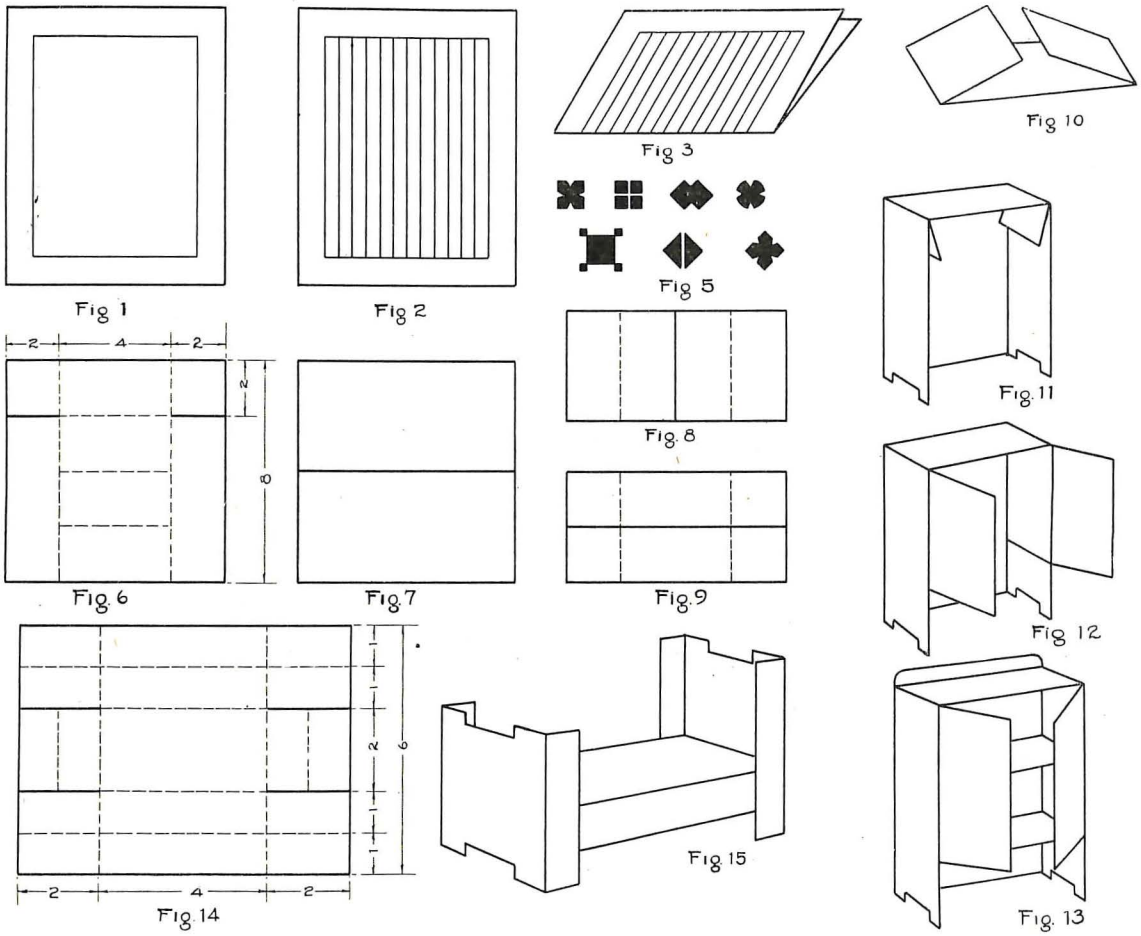
To create, thru the child's interest in construction, an interest in other lines of work.

To teach appreciation of harmony of color.

To make concrete much that is abstract, especially number.

Material:

Tinted construction paper for the furniture.



Second Grade.

Tinted construction paper, jute, and candle wicking for the floor coverings.

Mat for Kitchen Floor.

The first covering for the floor may be woven of strips of tinted construction paper one-half inch wide.

The dimensions of the mat must be determined by the size of the kitchen floor. If the mat is to be 8″x10″, proceed as follows:

One inch from each corner along the edges of the paper, place dots. Lay the ruler across corresponding dots, and draw line extending one inch from one edge to one inch from the opposite edge. Fig. 1.

Place dots one-half inch apart on shorter lines just drawn and connect corresponding dots by straight lines. Fig. 2.

Fold short edges together as shown in Fig. 3, and cut along vertical lines to horizontal line drawn one inch from edge of paper. Unfold, and the foundation part of mat is finished.

Pass to each pupil another sheet of paper of another tint, 8″x10″. Place the ruler along the long edges and place dots one-half inch apart. Connect corresponding dots by straight lines. Cut into one-half inch strips by following lines drawn. Weave these strips into foundation mat as shown in Fig. 4.

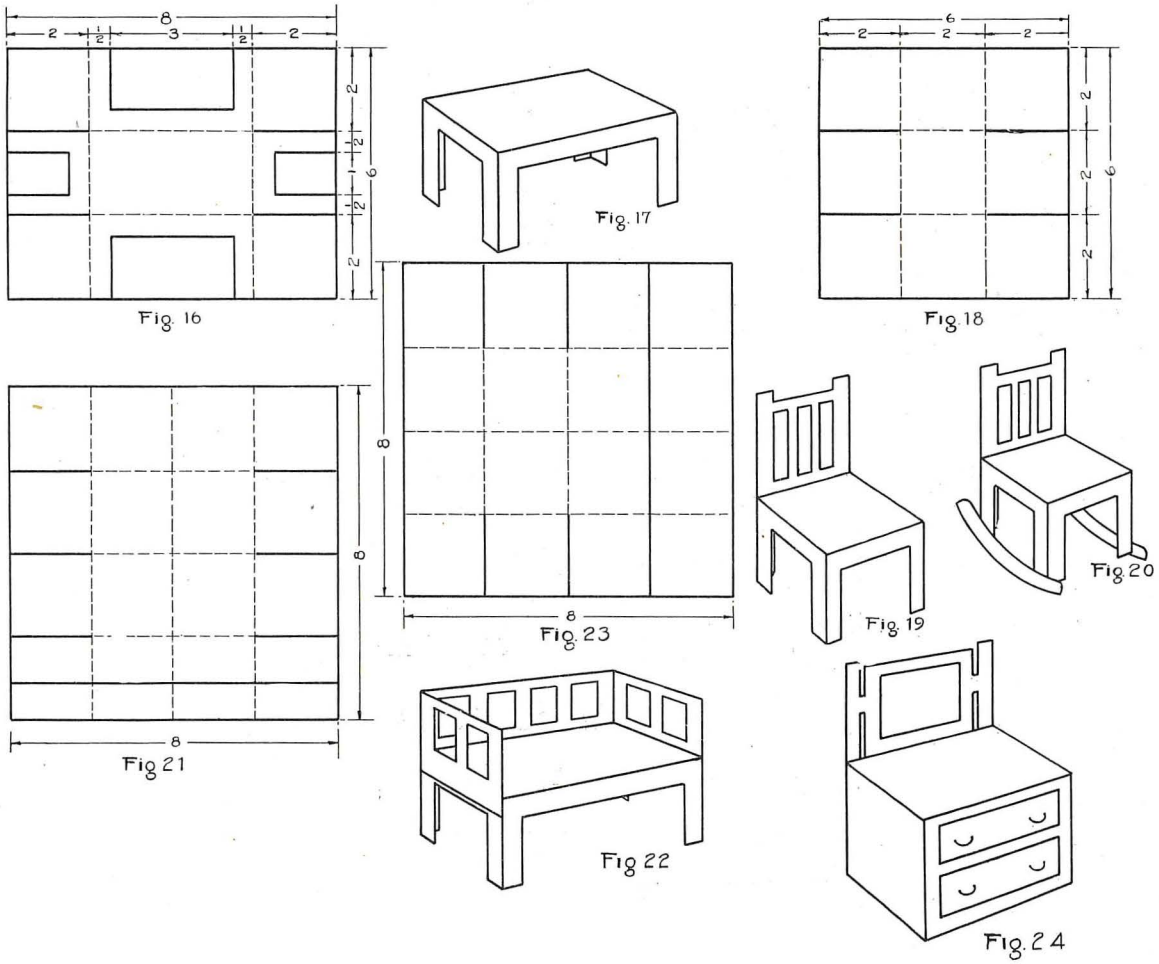
Making a Block Print.

If so desired, small block prints may be made of corks or various shaped pieces of wood. The head of a match may be cut away and the opposite end of the stick used as a block print. Small sticks, like the colored ones used in second grade, make good square prints. Quarter-inch dowel rods, such as used in manual training, make good circular prints. Small blocks, a quarter, or even a half-inch square, at the ends, may be used as prints. With a small file (a finger file will do), these blocks may be cut or filed across and in the edges, so that very simple but interesting prints may be made.

Fig. 5 suggests a few simple prints made of small pieces of wood or corks.

How to Use the Block Print.

A small piece of felt, or any other piece of cloth that will absorb, may be saturated with dye. The block is first pressed to the saturated piece of cloth, and then stamped on the surface where the design is wanted. This is not a slow and tedious process, but one that works up very quickly and very effectively. When a mat is finished, a block print may be stamped on each light square. If the mat is given a coat of shellac or varnish, it makes a better floor covering and looks a little like linoleum.



Second Grade.

Making a Cupboard.

It is not necessary to have a doll house in the second grade. This is one of the grades, however, in which a doll house is very much appreciated, and if convenient, have the house.

In the first grade, each piece of furniture was made as simply as possible. In this grade, each piece may be made in parts and then assembled.

Material:

Two 6″ or two 8″ squares of tinted construction paper.

First. Draw an 8″ square. (Fig. 6.)

Second. Use 2″ measurements, and draw the lines as shown in Fig. 6. Continuous lines are to be cut. The dotted vertical lines should be scored.

The two lower horizontal dotted lines show position of shelves.

Third. Fig. 7 shows 8″ square; one-half to be used for doors and the other half for shelves.

Fourth. Fig. 8 shows where to cut and where to score doors.

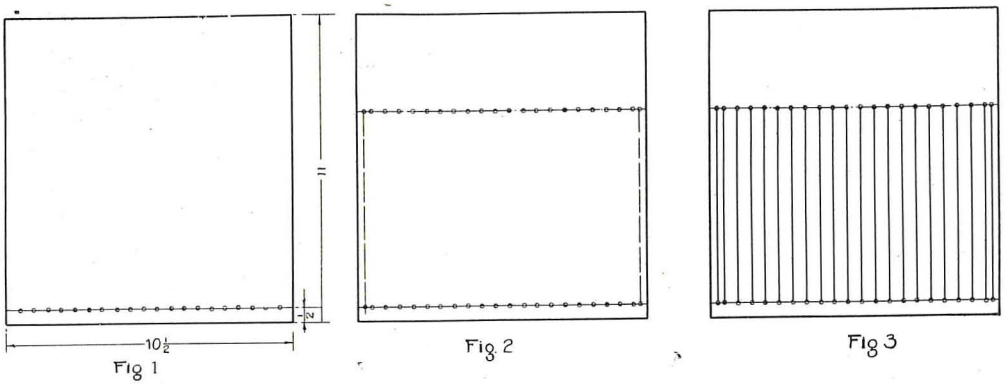


Fig 1 Fig 2 Fig 3

Fig 4 Fig 5 Fig 6

Third Grade.

Fifth. Fig. 9 shows cutting of shelves.

Sixth. Fig. 10 shows folding for shelves.

Seventh. Fig. 11 shows the way Fig. 6 is folded.

Eighth. Fig 12 shows the way the doors are pasted to inside.

Ninth. Fig. 13 shows placing of shelves and finished cupboard.

To Make a Bed.

First. Draw a rectangle 6″ wide and 8″ long.

Second. Draw dotted lines 2″ apart as shown in Fig. 14.

Third. Draw continuous lines and proceed to fold as when making a box with double sides. (See work of former month.)

Fourth. Cut rectangle 3½″ long and 2″ wider than the box. Fold over 1″ along sides and paste to head of bed as shown in Fig. 15. This adds strength.

Fifth. Cut rectangle 2½″ long and 2″ wider than box.

Fold over 1″ along sides and paste to foot of bed. Cut head and foot as shown in Fig. 15.

By doubling head and foot strength is added to the bed.

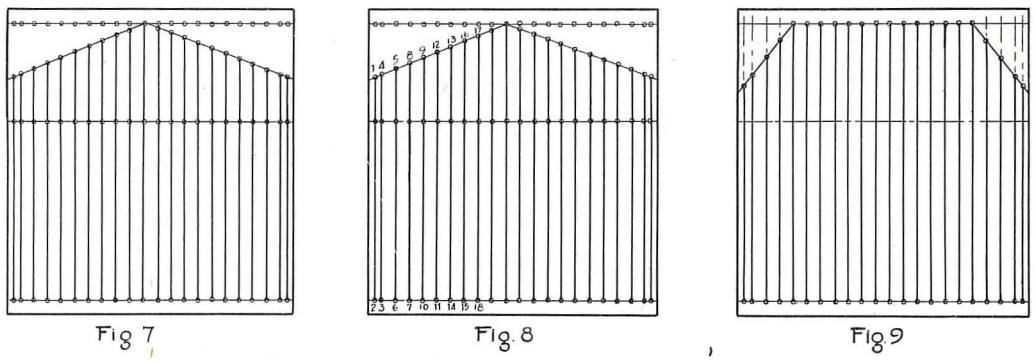


Fig 7 Fig 8 Fig 9

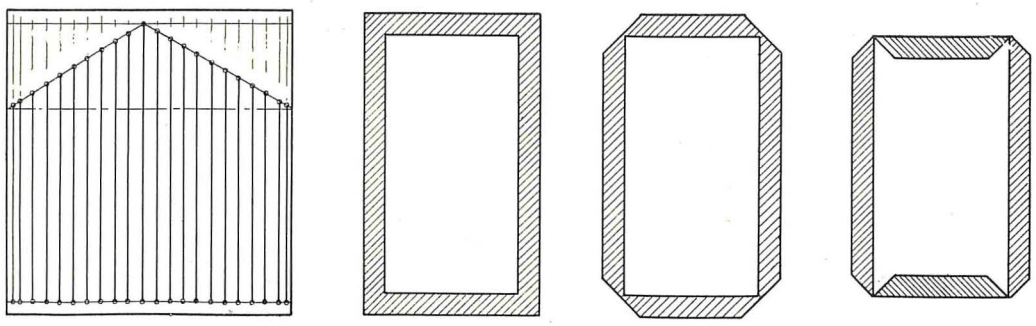


Fig 10 Fig 12 Fig 13 Fig 14

Third Grade.

Fig. 11. Third Grade.

To Make a Table.

First. Draw a rectangle 8″ long and 6″ wide. Fig. 16.

Second. Draw dotted lines 2″ apart.

Third. Cut continuous lines so the square corners will fold and paste in end, before cutting legs. The several thicknesses add strength to the legs of the table.

Fourth. Cut all remaining continuous lines. See Fig. 17.

Number Lesson.

How much longer is the rectangle than it is wide?

Draw a line equal in length to one short edge and one long edge put together. What is the distance half way around the rectangle?

What is the length of the two short edges put together?

What is the length of the two long edges put together?

What is the distance around the rectangle? Use the word perimeter.

What is the perimeter of the top of the finished table?

To Make a Chair.

First. Draw a 6″ square.

Second. Draw dotted lines 2″ apart.

Third. Mark lines to be cut. (This is shown in the drawing by the continuous lines.)

Fourth. Paste and cut, as in table.

Making a Davenport.

Follow drawing 21.

Place strip of squares cut away so as to form back.

Cut openings in back before pasting in place.

Making a Dresser.

Drawings 23 and 24 show construction.

JANUARY.

Construction Work for Third Grade.

Book Bag.

There are certain districts in every city in which the construction of a book bag would create but little interest. While the construction remains the same, the bag may be made for shoes, and therefore find a place in some homes in which the book bag is not desirable.

The bag might be called a "catch-all," or a bag for soiled handkerchiefs and towels. The problem is one that may be made suitable to almost any class of pupils.

Purpose:

To give the pupils accurate measuring in the construction of the cardboard loom. If the school is furnished with the Todd looms, the construction of the loom is not necessary.

To give a simple problem in weaving.

To familiarize the pupils with the terms warp and woof.

To give the pupils an appreciation for a hand-made article.

To teach them to respect labor.

To give the pupils a practical problem.

To give them an opportunity to design, and to choose harmonious color combinations.

To make practical the number work.

Material:

One piece of clothboard 10½″x11″ or any other kind of heavy paper suitable for a loom. Hard-twisted 2-ply jute or any other material suitable for weaving.

Tools:

Number 12 or 14 darning needle.

Harper packing needle No. 8 to be used for weaving. Any large needle will do.

Rulers, pencils and scissors.

Presentation:

Since this problem, the bag, comes the nearest to a child's attempt to weave a piece of cloth, it would be well to furnish each child with a piece of coarse material like ordinary gunny-sacking, burlap, or monk's cloth, and have them unravel it before beginning to weave. In these samples, the threads are easily followed in the unravelling, and the warp and woof designated. It will be found that the warp and the woof are of the same material.

In the bag, the warp and the woof will not be of the same material, as the warp is to be of the regular cotton carpet warp, and the woof is of jute or any other weaving material.

There is a reason for this difference in the warp and the woof. If the warp is of the same material as the woof, which in this case is jute, the threading of the loom is more difficult. It is also more difficult to press the jute down in place, as there is a tendency for the woof to stick to the warp when it is of jute. The carpet warp is easily threaded into the darning needle, and the jute readily slips into place when woven over and under the warp.

Different fibers are often combined in the weaving of fabrics. There may be found in the market, fabrics that are a combination of cotton and wool, silk and cotton, silk and linen, and numerous other combinations.

If possible, secure a small amount of raw wool, cotton, silk, and flax. Let the pupils see that some of these fibers are animal products and some are vegetable. It is just possible that in some vacant lot in the vicinity of the school, stalks of tall weeds may be found. From many of these the outer covering of the stalk may be removed in long fibers. At least enough may be found and twisted with the fingers to give the pupils an idea of how the fibers of jute hemp, and flax are twisted by machinery into threads.

If an old spinning wheel can be found in the neighborhood, borrow it, and if possible, find someone who can run the wheel. From such a demonstration will grow numerous drawings, cuttings, history, oral and written language lessons, as well as giving the pupils an intelligent basis for their elementary weaving and sewing.

Construction of Loom.

Discuss with the class the use of the bag, its size and construction, the use of a flap and handles. If, for any reason, it is thought best to change the size of the clothboard, which is to serve as loom, from 10½″x11″, to other dimensions, feel perfectly free to do so.

In order to construct the bag so it will be closed at the edges, it will be necessary to thread the loom on both sides, and do the weaving around the board. The various drawings

also show the flap, which is woven in such a way as to cover the opening at the top when finished.

The threading of the circular mat of last month will aid greatly in the threading for the bag.

Place the clothboard so the $10\frac{1}{2}''$ edge is parallel with the front edge of the desk, and one-half inch from this edge, draw a straight line.

The warp threads are to be one-fourth inch apart. How many threads will it take to thread one side? If each warp thread, counting the stitch on the back, is $7\frac{1}{2}''$ long, how much carpet warp will it take to thread one side of the loom?

On the line just drawn, place dots one-quarter inch apart. Fig. 1. Seven inches from, and parallel to this, draw another line, and on it place dots one-quarter inch apart. Fig. 2.

Divide the first and last quarter inches into halves, as indicated by dotted lines in Fig. 2. Connect corresponding dots by straight lines. Fig. 3. This gives an idea of how the loom should look when threaded. At each dot puncture with darning needle. Number as shown in Fig. 4.

Thread the darning needle with carpet warp and begin to thread the loom on one side.

Bring the needle up thru 1, leaving an end. Down thru 2, up 3, down 4. With the end left and the thread in the needle, tie a hard knot close to 4. Come up 5 and down 6. Continue in this way until the loom is threaded on one side. The first two threads at each end are only one-eighth inch apart. The front side of the loom now looks like Fig. 3. The back looks like Fig. 5.

In threading, care should be taken to not draw the warp threads too tightly, as considerable slack is needed to allow for the passing over and under of the woof.

When threading the back, provision is made for the flap. The flap may be made in various shapes, as shown in Figs. 7, 9, and 10. To construct Fig. 7, proceed as follows:

On the back, shown in Fig. 6, draw a straight line one-half inch from edge. On this line place dots one-quarter inch apart. Divide the first and last quarter inches into halves, the same as when threading the front of the loom.

On the right and left edges of the loom, place dots $8\frac{1}{2}''$ from the front edge as indicated by points a and b, Fig. 6.

Find one-half of the line along the back edge, and connect points as shown in Fig. 6. On these slanting straight lines, place dots just opposite those on the line above.

Place the ruler across corresponding dots, and connect by straight lines as shown in Fig. 7. This gives an idea of how the back will look when threaded. Number the ends of lines, Fig. 8, and with the darning needle, puncture each point.

Begin to thread by bringing the needle up thru 1, down 2, up 3, down 4, and tie a hard knot. Continue until this side of the loom is threaded.

The threading of the loom is now completed, and the weaving is to begin.

Take a piece of jute long enough for the child to conveniently handle. Thread it in the packing needle, and begin to weave by passing the needle over one and under one. Weave around edges of cardboard. When once around it will be found that the needle passes over and under the same warp threads. This is due to the fact that there are an even number of warp threads. In order to do continuous weaving and not have it come so, there must be an uneven number of warp threads.

We have, however, an even number; so, to avoid passing under and over the same threads, the needle each time around is passed *under* two warp threads, and then proceed in the usual way. Never pass the needle over two threads unless you wish the over-stitch to form some part of the decoration. In this particular case, this sort of decoration is not wanted.

When adding a new thread, weave the new thread along with the old one for two or three inches, thus avoiding knots. Continue weaving around the cardboard until the bag part of the problem is finished. The weaving of the flap is done on one side by weaving back and forth.

When the weaving is completed, the small strips at the top and bottom are broken off and the remainder of the cardboard is slipped out in one piece. It will be found that the bag is open at the bottom. This necessitates sewing across the bottom with a simple over-and-over stitch.

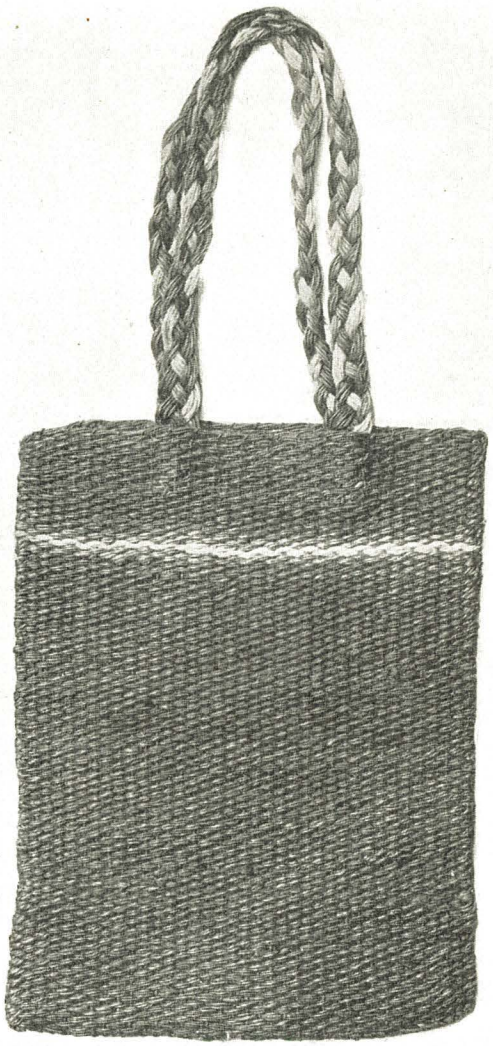


Fig. 11 A. Third Grade.

For the handle, make either a three or a four-strand braid of the jute, using strands of different color. The braid sewed to the edge of the flap makes a very attractive finish. Fig. 11 shows the finished bag. If the Todd loom is used two rugs are woven and sewed together as shown in Fig. 11A.

Hinged Spelling Blank Cover.

Children delight in the construction of any kind of a book for which there is a direct use. The value of construction work is so often placed on the finished product and not on the processes producing the article. The finished product is the least to be considered when one takes into consideration the development that is brought about thru the construction.

Purpose:

To give the pupils a practical problem in simple book construction.

To give the pupils a way of preserving their spelling lessons.

To give a choice in combinations of colors.

To give an opportunity to make practical the number acquired thru the academic work.

Material:

Four pieces of cover paper.

Two pieces of jute board. Cardboard taken from boxes will answer the purpose. One piece is cut $3\frac{1}{4}''$x$6\frac{1}{4}''$, the other piece $3\frac{1}{4}''$x$5\frac{7}{8}''$.

Bookbinder's cloth (Vellum de Luxe).

Paste.

Two brass paper fasteners.

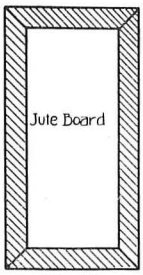


Fig. 15

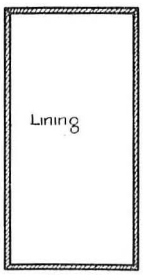


Fig. 16

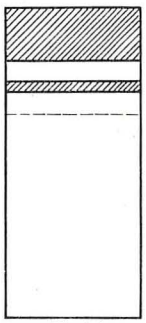


Fig. 17

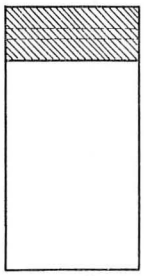


Fig. 18

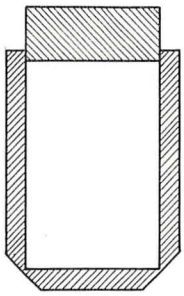


Fig. 19

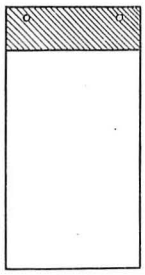


Fig. 20

Tools:

Ruler, scissors, punch, and book press.

Presentation:

Show the pupils a finished cover. Place before them the various colors of paper and bookbinder's cloth, allowing them to make a choice in combining colors. This is the first book in which the edges of the foundation board are covered.

There are really two problems in one, as the back and the front covers are constructed quite differently.

Let us first consider the back cover, which is $3\frac{1}{4}''$x$6\frac{1}{4}''$. This is to be covered by some tint of cover paper chosen by the pupil.

Cover paper is preferred to tinted construction paper because of its weight. The heavier the paper, the more difficult the pasting.

In all construction, so far as possible, present problems to the pupils giving them an opportunity to work out the required dimensions.

For example: The foundation cover is $3\frac{1}{4}''$ wide and $6\frac{1}{4}''$ long. How large must a piece of cover paper be cut to turn over one-half inch on each edge to the inside? Fig. 12.

Apply paste to the cover paper and lay the jute board on it in such a position that the cover paper extends one-half inch beyond each edge of the jute board. Fig. 12.

Cut away each corner of the cover paper as shown in Fig. 13.

It will be observed that the corner of the cover paper is cut so it lacks about one-eighth of an inch from touching the edge of the corner of the jute board.

Turn the cover paper over to the inside of the jute board. Turn upper and lower edges first, as shown in Fig. 14. With the thumb or finger nail, press in the corners and then turn the cover paper along the sides to the inside of jute board. Fig. 15.

These covers may now be placed in the book press.

To finish the cover, a lining of the same color paper as is used on the outside must be cut $\frac{1}{4}''$ shorter and $\frac{1}{4}''$ narrower than the jute board, and pasted over the inside of Fig. 15. The lining is 3″x6″. This allows a margin of $\frac{1}{8}''$ as shown in Fig. 16.

The Hinged Cover.

From the piece of jute board $3\frac{1}{4}''$x$5\frac{7}{8}''$, cut a half-inch strip from the short edge.

Cut a piece of bookbinder's cloth $3\frac{1}{4}''$ x $2\frac{1}{2}''$. Fold this strip into halves, lengthwise. Apply paste to bookbinder's cloth and lay the narrow strip of jute board so one long edge just meets the crease. One-quarter inch from the other long edge of the narrow strip of jute board, place the larger piece of jute board, as shown in Fig. 17.

Fold the upper half of bookbinder's cloth (Fig. 17) so it comes down over the narrow strip and on to the larger piece of jute board. Fig. 18. The quarter-inch space between the narrow strip of jute board and the larger piece, forms the hinge, allowing the large piece to be turned back when so desired. It will be observed that the edges of the bookbinder's cloth just meet the edges of the heavy paper used in the foundation covers. If the teacher so desires, the bookbinder's cloth may be cut $4\frac{1}{4}''$x$2\frac{1}{2}''$. Paste is applied, and the pieces placed as above described. It will now be found that one-half inch of the cloth extends beyond the edges of the cover. One thickness of the cloth is cut away. The other part is turned in at each edge before the upper half is turned down over the hinged part. By cutting away a triangular piece from each edge of the half folded over a neat finish is secured. By this process the edges of the cardboard are covered, thus making a more neatly finished cover.

It is now necessary to cover the jute board with cover paper. Fig. 19. This is done the same as in Figs. 13, 14, and 15. Cut lining as in Fig. 16.

While constructing the hinged cover the back should often be used as a reference. The hinged cover must, when finished, be just as long and as wide as the back cover. Two holes may be punched thru the back and narrow strip, and brass paper fasteners used to bind the cover and spelling papers together. Fig. 20.

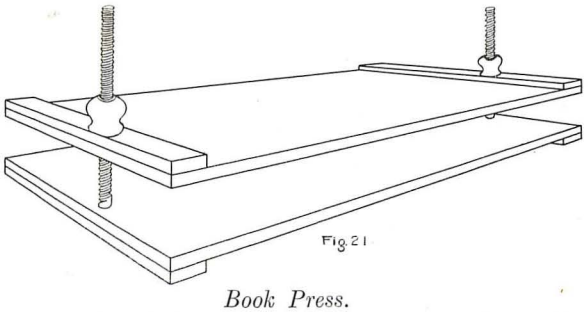


Fig. 21

Book Press.

A simple and inexpensive book press may be made as shown in Fig. 21. Fig. 22 shows the working drawing. This press may be made by the boys in elementary manual training. If there is no manual training department in the building have a carpenter make it. Even the simplest kind of bookbinding is poorly done without a press. The wooden screws are $\frac{3}{4}$ of an inch in diameter and 12 inches long. These may be purchased of Cobb-Whyte & Laemmer Co., 179 N. Clark St., Chicago.

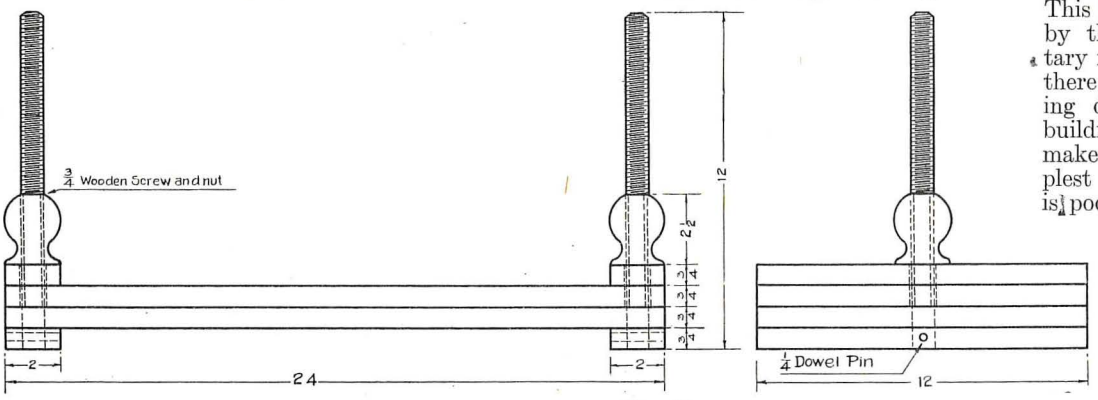


Fig. 22

Third Grade.

A Proposed Amendment to Child Labor Laws

(Editorial)

The Federal Law recently enacted, forbidding interstate commerce in commodities, in the manufacture of which, children are employed has awakened public opinion regarding child labor as well as compulsory school attendance.

The deplorable condition resulting from the laws governing school attendance and child labor is that society thru the public schools controls almost entirely the activities of children up to that point at which the law permits them to go to work, but at this point, society releases its control almost entirely. On that day at which the child crosses the line between the age of 13 and 14, or 14 and 15, as the case may be, society changes its attitude toward the child to a very large extent. The change comes suddenly; on one day the child is compelled to attend school and cannot be allowed to go to work; abruptly on the next, society has released him and he is permitted to do largely as he pleases. In a very few states, the law compels the child to return to the control of the school for a period each week varying from 5 to 8 hours.

Even in those states where such laws are in operation, the law does not make any provision for the preparation of the child for entering upon an occupation. To meet this condition, the following legislation is proposed:

"No person under the age of 16 *subject to compulsory school attendance laws shall leave school to enter employment unless he has at least six months previously, given notice of such intention to the Superintendent of Schools or the Board of Education. During the six months following such notice, the school shall provide such courses and instruction as will give the best possible preparation within the limitations of time and facilities at hand for entrance into some form of profitable employment; and shall endeavor to assist persons receiving such preparation to find suitable employment."*

It is obvious that the enactment of such a law, unlike some other child labor laws, will in no way be an infringement upon the child. It is every child's inherent right to have as broad an education as possible during his period of growth and development. It is no doubt unfortunate that any child should ever be compelled to leave school for any reason before the period of adolescence has been passed. It is obvious, too, that a very large number of young people are forced by economic necessity to enter upon employment before reaching young manhood or womanhood. Conditions in modern industry are not such that the adolescent boy or girl can enter industry and there receive that training which fits him properly for employment. In other words, modern industry does not provide for advantageous entrance for the callow youth going directly from the school. On the other hand, the school cannot well undertake to give all young people specialized training for employment during their adolescence. Many will prolong their education beyond this period. The only justification for specialization in school instruction for adolescents is the imminence of entrance upon employment. The only method by which the school can determine what persons will enter industry early is their own statement. The enactment of such a law as that proposed would place upon the minor or his parents the responsibility for such a choice. It would give the school the opportunity to give specialized training at that time when it is needed without in any way encroaching upon the child's right to a broad education.

The minor having once given notice of his intention to enter employment would thus automatically select himself for training. The school would then be entirely justified in fitting him for immediate employment. The period intervening between the giving of the notice and the actual entrance on employment would be one during which the school could place before the child all available information concerning various occupations, the chances of promotion, working conditions, etc. If the school did no more than to hold the minor for this period during which his aptitudes are studied by the school authorities, the various occupations are studied by the pupil, and opportunities for entrance into employment investigated by both the school and the pupil, the school would have rendered an invaluable service.

The proposed law does not necessarily provide for raising the compulsory school age. A child 13 years and six months old might give notice that he intended to leave school at 14. The giving of this notice, however, would place the school in a position to give training fitting for immediate employment. It would remove the danger of the school's imposing specialized training upon those persons who intend to remain for a full high school course.

Furthermore, the enactment of this law does not involve the question of a separate school or anything of that character. It simply places upon school authorities the responsibility of preparing the minor for advantageous entrance into industry after the minor has signified his intention of entering such employment at a stated time.

This proposition is submitted at this time and in this manner in order that it may be seriously considered. There are possibly minor defects in it and obstacles in the way of its enactment into law. It seems, however, to suggest a simple amendment to our present laws governing the employment of minors, which offers wide possibilities.

INDUSTRIAL-ARTS MAGAZINE

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EDITORIAL

NO CONFLICT OF AIMS.

ONE phase of genuine education must not be lost sight of. That is the effect of the processes of education upon the individual. There is danger of being controlled entirely by the external needs and conditions. There is tremendous force as well as entire justice in the demand for efficiency, marketable skill, etc.; and yet there remains that ever-pressing need for preparation to live with one's self. The ends of education for the individual will in no large sense be met without the clearing of his vision, the raising of his ambition, the refining of his tastes, the broadening of his sympathies, and the quickening of his appreciation of the finer things of life.

The encouraging thing about it all is that there is no real antagonism between these apparently conflicting aims of education. The demand for efficiency, skill, and industrial intelligence can be made and is being made the most effective instrument for the securing of the finest attributes that education can give.

There is no field in which the highest aims of education can be so effectually met as in the field of industrial education, if the subjects are properly conceived, wisely enriched, and skillfully presented.

WHY CAN'T WE DO THAT?

FREQUENTLY superintendents read of new and rather striking results that are being accomplished by manual training teachers in other places. Article in hand, they rush at once to their own manual training teachers and demand, "Why can't *we* do something like that? Why can't *we* get results like they get in other places? Let's get busy."

This would be a most wholesome situation, if such expression really meant, "Let *us* get busy;" but it usually means, "YOU get busy."

The teacher usually knows very well "why *we* can't do something like that." He knows that such results are gotten where the manual training teacher is not handicapped by a hundred conditions. He knows that in places where these unusual things are done the teacher is not hampered by an impossible number of classes and an impossible number of pupils in each class. He knows that those fortunate places give the manual training classes time enough to do some real work. He knows that in such places one teacher is not required to do the work of three teachers and to be janitor and school carpenter besides. He knows that in such places, teachers have sufficient help to make it possible to assign small groups to the working out of some unusual undertakings, and that if he had the same *conditions*, he could get similar results.

But these are the things that are difficult to get a superintendent to understand. He is inclined, we fear, to attribute the lack of results in his own school system to the inefficiency of the teachers rather than to the conditions under which they work; and, sadly enough, this is too frequently the case. But the teachers should have the benefit of the doubt. It should not be demanded of them that they turn out marvelous exhibitions of work, until the superintendents are reasonably sure that the conditions in their own systems are in some measure as favorable to such work as they were in the schools from which the unusual results were reported.

THE PROBLEM OF DISCIPLINE.

HOW difficult it is to manage a group of boys only those with experience can fully appreciate. There seems to be something in the very make-up of a boy that rebels at the thought of being driven from one task to another. And it is not always an encouraging situation when a boy is willing to submit without question or protest to the dictation of somebody else.

Too often in the past, teachers have been task masters. Too often they have ruled by mere arbitrary authority instead of by reason and by the very strength of their personalities.

We fear a good many teachers have been spoiled by that old, false adage, "Familiarity breeds contempt." Nothing could be farther from the truth. We are of the opinion that the more people know of each other on a high plane of thought, the more they find in each other to excuse and admire and the less to condemn and despise.

It is a great misfortune for a teacher's attitude of superiority to put his pupils on the defensive before there is time for them to learn the full truth. An intelligent, ambitious young teacher had aroused the enmity of his pupils. Upon being asked why the class disliked the teacher, one of the most unpromising of the group replied, "Humph! He thinks we don't know nuthin'."

The most successful disciplinarians are those who are *fellow workers* with the pupils, interested in the very problems that occupy the attention of the class. Such teachers are discreet in their dealings; sane and fair in their criticisms; sympathetic with the difficulties and shortcomings of individuals; and, above all, respectful in the highest degree toward every pupil and considerate of his every effort.

TEACHERS' ENGLISH.

WHATEVER may be the special lines in which teachers are engaged, they can't get away from the fact that they are still expected to be familiar with the common means of communication—spoken and written English.

There are perpetual and overwhelming reminders that many of the special teachers (to say nothing of the others) are either woefully deficient or else painfully negligent in the fundamentals of writing, spelling, punctuation, and sentence structure. Perhaps these are regarded as non-essentials for special teachers. This is, however, an unfortunate view, since it is largely thru these fundamentals of English that such teachers can hope to give adequate expression to their own work and conclusions. Furthermore, for any group of teachers to assume that they can ignore as non-essential the very means of intercourse with their fellows would be very short-sighted indeed.

Hence, we are inclined to believe that in the press of preparation for the technical details of a new work, and in the urgency of manifold duties under adverse conditions in the new field, some of the important items of education outside of these technical matters have, for the time, been neglected.

Every year, many instances come to our attention of teachers' failure of employment, because of poor writing and poor spelling shown in letters written to those whose business it is to select teachers. Whether justly or unjustly, employers of teachers take such defects as typical of their preparation, their thinking, and their general ability.

Spelling and writing are arts. They are acquired by practice. Any person can in a very short time materially improve his ability in both. What a pity, therefore, that anyone should permit such handicaps to stand between him and greater success.

If we were asked to name some things that would greatly enhance one's chances for promotion, we should place not far down the list, the ability to write a clear, legible letter in simple, expressive language according to recognized usages of good English.

THE PRESIDENT URGES FEDERAL LEGISLATION.

President Wilson in his message to Congress, on December 5, said:

At the last session of the Congress a bill was passed by the Senate which provides for the promotion of vocational and industrial education which is of vital importance to the whole country, because it concerns a matter, too long neglected, upon which the thoro industrial preparation of the country for the critical years of economic development immediately ahead of us in very large measure depends. May I not urge its early and favorable consideration by the House of Representatives and its early enactment into law? It contains plans which affect all interests and all parts of the country, and I am sure that there is no legislation now pending before the Congress whose passage the country awaits with more thoughtful approval or greater impatience to see a great and admirable thing set in the way of being done.

A NOTABLE RECORD.

IN a recent report of the Rollo Consolidated School in Northern Illinois, there is one very striking item. One-half of the entire attendance is in the high school. Of all the students that have entered the high school during the last three years, not a single one has dropped out except for graduation.

One of the reasons advanced for this satisfactory condition is the fact that courses in agriculture, manual training, domestic science, are given in a thoroly practical way to fit the needs of an agricultural community.

What a potent force the real thing is when one actually finds it!

Too much is asked of the teacher. He is expected to do what the system and the machine make it difficult to do; he is expected to be not only sage, philosopher and friend, but to take the place of the parent, to be the substitute for the godfather and the godmother, to do what they do not. Yet in spite of every disability the born teacher is all these things; and whether it be in the elementary, the secondary, or the public school there is more power for the time being in the hands of the teacher, in the presence of the teacher with his handful of pupils, than there is in the hands of the leader of a government in the presence of his followers. That may sound trite; but it is just as well to remember that such things are true, and to my mind there is no more pleasing thing in the world than the admiration of an old boy for an old teacher, unfailing while the human machine runs on.—*Gilbert Parker.*

And the great cry that rises from all our manufacturing cities, louder than their furnace blast, is all in very deed for this,—that we manufacture everything there except men: we blanche cotton, and strengthen steel, and refine sugar, and shape pottery; but to brighten, to strengthen, to refine or to form a single living spirit, never enters into our estimate of advantages. And all the evil to which that cry is urging our myriads can be met only in one way; not by teaching nor preaching, for to teach them is but to show them their misery, and to preach to them, if we do nothing more than preach, is to mock at it. It can be met only by a right understanding, on the part of all classes, of what kinds of labor are good for men, raising them and making them happy; by a determined sacrifice of such convenience, or beauty, or cheapness, as is to be got only by the degradation of the workman; and by equally determined demand for the products and results of healthy and ennobling labor.—*Ruskin.*

Salaries of Manual Training Teachers

The Public Education Association of Buffalo, N. Y., has recently completed a study of the salary schedules in force in 22 large cities of the United States. The association purposely omitted from its consideration the salary schedules of New York City and Philadelphia, because the conditions in these communities are unusual and are hardly paralleled in smaller cities.

The schedules of manual training directors and teachers which are reproduced on this page, exhibit some glaring inequalities and inconsistencies. The directors of manual training and the teachers are apparently held in radically varying worth by the several school boards. Thus, Milwaukee pays its supervisors of industrial education, $5,500, whereas Buffalo and Rochester pay their directors only $1,600, and Omaha only $1,550.

It would be interesting indeed to compare the efficiency of the various manual training departments in the several cities in the light of the salary schedules which are in force.

SALARY SCHEDULES OF MANUAL TRAINING DIRECTORS IN 21 CITIES, 1916.

City	*Title*	*Minimum Yearly Salary*	*Yearly Increase in Salary*	*Years Required to Reach Maximum*	*Maximum Yearly Salary*
Baltimore	Supervisor of Manual Training and Cookery Centers (a)	$2,100	...	..	.....
Boston	Director of Manual Arts	3,060	120	3	$3,420
	Asssociate Director	2,340	120	8	3,300
	Assistant Director	1,500	120	9	2,580
Buffalo	Director	1,600	100	6	2,200
	Assistant Director	1,200	100	3	1,500
Cincinnati	Supervisor	2,000	100	4	2,400
Cleveland	Supervisor	2,000	100	5	2,500
Detroit	Director (b)	3,600	...	..	.....
Indianapolis	Assistant Superintendent (c)	4,000	...	..	.....
Jersey City	Director Manual and Industrial Training	2,000	125	8	3,000
Kansas City	Director of Vocational and Manual Training	3,300	...	..	.....
Los Angeles	Supervisor Manual Training (d)	2,580	...	..	.....
	Supervisor Manual Arts (e)	2,580	...	..	
	Assistant Supervisor Manual Training	1,680	...	..	.....
	Assistant Supervisor Manual Arts	1,680	...	..	.....
Milwaukee	Supervisor of Industrial Education	5,500	...	..	.....
	Supervisor Elementary Manual Training	1,860	60	11	2,460
Omaha	Supervisor	1,500	...	..	.....
Pittsburgh	Director of Industrial Training	3,000	...	..	.....
	Supervisors of Industrial Training	1,500	100	6	2,100
Portland	Supervisor of Manual Training	2,000	...	..	.....
Rochester	Assistant Supervisor of Vocational Education	1,600	...	..	.....
Salt Lake City	Director of Manual Training	2,850	...	..	.....
San Francisco	Supervisor of Manual Training	1,920	...	..	.....
Seattle	Director of Manual Training	2,700	...	..	.....
St. Louis	Supervisor of Manual Training (g)	2,150	(f)	6	3,000
St. Paul	Supervisor of Manual Training	.....	...	..	1,800
Washington	Supervisor	2,200	100	5	2,700
	Assistant Supervisor	1,300	50	5	1,550

(a) Manual training and cookery supervisor teaches sixteen periods per week in Polytechnic Institute and two periods per week at Teachers' Training School.
(b) Has charge of household arts.
(c) Has charge of all vocational education.
(d) Third to eighth grades inclusive.
(e) First and second grades.
(f) Increase $150 the first year; second, third and fourth years, $100; fifth and sixth years, $150.
(g) Has supervision of domestic science and art.

SALARY SCHEDULES OF MANUAL TRAINING TEACHERS IN 21 CITIES, 1916.

City	*Title*	*Minimum Yearly Salary*	*Yearly Increase in Salary*	*Years Required to Reach Maximum*	*Maximum Yearly Salary*
Baltimore	Teachers in Manual Training Centers	$ 650	$ 50	3	$ 800
Boston	Assistants in Manual Arts	1,212	72	6	1,644
	Instructors in Manual Training in Elementary Schools	1,128	72	3	1,344
	Assistant Instructors in Manual Training Elementary Schools	852	48	8	1,236
	Shopwork Instructors	1,068	60	8	1,548
	Prevocational Instructors Elementary Schools	1,332	48	4	1,524
Buffalo	Ninth Grade	900	100	6	1,500
	Below Ninth Grade	600	50	8	1,000
	Vocational Assistants	900	100	6	1,500
Cincinnati	Men	900	100	6	1,500
	Women—if College Graduates	650	50	10	1,150
	Women—if High School Graduates	500	50	13	1,150
Cleveland	Manual Training Teacher of Piano Tuning to Blind Pupils	1,400	...	..	.....
	Assistant to Supervisors	1,000	50	4	1,200
	Seventh and Eighth Grade M. T. Shop Teachers	900	100	6	1,500
Detroit	Manual Training Teachers of Woodworking	900	100	6	1,500
Indianapolis	Manual Training Teachers (a)	750	75 for first two years, then 50	5	1,050
	Shop Teachers Class A	900	75	4	1,200
	Class B	1,275	75	1	1,350
Jersey City	Vocational Department, Academic	660	48(b)	14	1,320
	Manual Training and Shop Work	1,000	100	7	1,700
Kansas City	Manual Training	800	50 (1st 2 years, 100 thereafter)	4	1,100
Los Angeles	Sloyd	768	48	9	1,200
Milwaukee	Teachers	780	60 (c)	11	1,200
Omaha	Graduate Teachers	600	50	8	1,000
	Non-Graduate Teachers	500	50	10	1,000
Pittsburgh	Teachers	1,000	100	5	1,500
Portland	Elementary Schools	900	100	3	1,200
	High Schools	1,250	100 (2nd year, 50 thereafter)	5	1,500
Rochester	Teachers	500	50	11	1,050(d)
Salt Lake City	Teachers	900	...	..	1,200
San Francisco	Teachers	960	...	..	1,320
Seattle	Teachers, Elementary Benchwork	930	60	4	1,170
St. Louis	Teachers	920	100 (1st year, 80 the 2nd, 100 thereafter)	5	1,400
St. Paul	Grade Manual Training	800	...	..	1,000
Washington	Teachers in Grades	650	(e)	16⅔	1,000

(a) Grades fourth, fifth, and sixth.
(b) Except that from the thirteenth to the fourteenth year the increase is $36.
(c) Increase of $60 first and second years, no increase third year, $60 fourth and fifth years, no increase sixth year, $60 increase seventh year, no increase eighth year, $60 ninth year, no increase tenth year, $60 eleventh year.
(d) Teachers with grade experience receive a maximum of $1,100.
(e) Increase of $25 for ten years, then $30 for 6⅔ years.

Graphs Used to Promote Efficiency in School

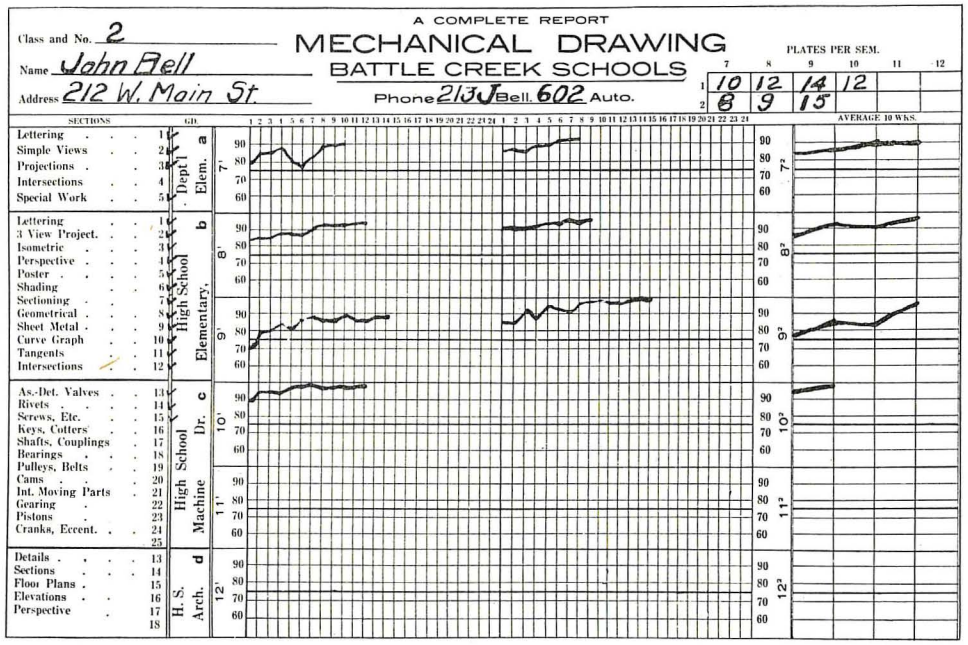
O. R. Webb, Battle Creek, Mich.

AS the cry for more practical and efficient methods is being heard thruout our country for the training of the average boy into something useful as well as giving him the old "reading, writing, arithmetic" system, it has become necessary for the teaching profession to become more and more skilled, applying all their work, wherever possible, directly to practice in the practical world outside.

If this is to be worked out correctly the instructor should include all things new and practical, pertaining to his particular subject, and should use efficient means of keeping an accurate account of the student, his worth, progress, ideals, and abilities, in fact should make the schoolroom a department where the subject in hand is taught in its usable form in life.

As the subjects taught conform to the immediate needs of institutions near the school it is found that the heads of those same institutions give valuable service toward bettering the conditions and mental value of their future employees. The worth of this thing should not be underestimated. The school is the easiest place to install everything important that has been tried and found valuable in practical life.

A very simple and accurate form of keeping account of a student is by the very practical graph system, thru which the student can watch his own progress, correct his own failures, and above all show his real worth by comparison. All students are by nature a bit proud to keep their record up to the highest ability and thereby prove their money-making capacity.



	1912	'13	ATTENDANCE '14	'15	'16	'17	DATE ENTERS LEAVES	ATT.	PROG.	TIMES TARDY	HOURS LOST	
Sept.			17	20			9/12/12	G	P	2	1	'12
Oct.	4	16		1			12/21/15	G	F	1	½	'13
Nov.								G	G			'14
Dec.	3-15							G	G	1	¼	'15
Jan.		16	12									
Feb.		3-4										
March			1-2									
April		10										
May												
June												

REMARKS

Worker – Slow 12/20/12
Improves – Uses head to advantage 10/10/14
Eyes bother – 12/21/14
Glasses help him – Steady and much swifter 12/21/15
Left school. 12/21/15 Asst. Draftsman. Johnson Engr. Co.

An Actual Student's Record prepared by the use of a Graph.

Above is found a card for indexing that keeps the full account of a student from the time he enters the school to take up mechanical drawing, until he graduates from the high school or gets into practical work. This is only one of the many applications of this important thing, as it is possible also upon one card to keep an account of a student in all branches of his work for the benefit of the instructor, future employer, and the student himself.

Upon the front of the card is found a list of the general subjects to be covered in mechanical drawing and as fast as completed the student is allowed to cross off the same. At the top is room for address, telephone, number of plates done per semester, etc. Central portion shows cross lines, horizontally showing percentage per plate and vertically showing number of plates. There are twelve sections, each of which represents a semester of work, starting with the seven-one grade and clearing thru the twelve-two. At the marking of a plate, and the checking off of the same, red ink is used to connect up the marks at the intersections of the lines. This then makes a curve that is easily read and shows many important things about the student. Heavy lines at the percentages of 75 are the lines below which it is not well to go. At the right will be found crosslines for the marks given out every ten weeks for the student's report. On the back is shown absences, progress, attitude and certain remarks concerning the student which are necessary to understanding him and his ability.

This system having been tried out and found to be very worthy and easily kept, taking little more time than that required to mark a plate and at the same time showing all ability and progress in a glance, looks favorable to a wider application in both school and factory.

INDUSTRIAL ARTS ASSOCIATION ACTIVITIES

FIRST MEETING OF THE SCHOOL CRAFTS CLUB.

The first meeting of the School Crafts Club of New York for the year 1916-17 was held Saturday evening, November 11, in the Engineering Building, New York. There was an unusually large attendance and six new members were admitted.

Mr. Merritt W. Haynes, Principal of the Bayonne, N. J., Vocational School, the newly elected president of the club, called the meeting to order and asked for reports from committees. Several very important matters were consummated. It was decided to adopt The Industrial-Arts Magazine as the official club paper and arrangements have been made to give it free to all members. The Survey Committee is making a complete survey of industrial-arts work and is progressing rapidly. The treasurer announced a substantial balance on hand.

Mr. E. M. Healy, of Pratt Institute, Brooklyn, N. Y., presented the offer of the Portland Cement Company to give a free course in cement work. The company will supply two instructors to teach the work during the Christmas holidays. There were 35 members present who applied for membership in this class.

The meeting was then turned over to Mr. E. A. Reuther, of the New Jersey State Department of Education, who introduced the first speaker, Mr. Arthur D. Dean, Director, Division of Agriculture and Industrial Education, New York State Department of Education.

Mr. Dean gave a very masterly review of the beginning and development of the practical arts. From the time that the work was started in the monasteries and as it has developed since, he showed that, to a marked degree, it has been going in cycles but at the same time important advances were continually being made and the present status of the work represented the highest degree of development. It would be next to impossible to give all names and dates used by Mr. Dean in his talk. However, he made this point clear, that during the 35 years of his educational experience he had seen the birth, life, and death, but not the decay of manual training. He noted the differences in the manner of teaching the work in different places. In some, the old manual training idea was still clung to. In others, an advanced type of vocational work was being taught but without much idea of its usefulness in industry, while in others, notably Cornell, shopwork was given for an engineering end. In the last named place the work is not expensive but everything is done with reference to some work in the trade, e. g., not only one machine screw is made at a time but the modern factory method of making twenty or more at once is taught. The conclusions in general that he drew were, that this branch of school work is growing more alive and in closer touch with the industries and that industry is beginning to realize the value of the work.

The next speaker was Mr. R. W. Burnham, head Co-ordinator of Co-operative Work, New York City Schools. Mr. Burnham's work is that of placing public school pupils in the city's industries in four lines of activity: manufacturing, clerical, mercantile, and transportation. The pupils are taken for part of the school time and put into business where they are taught the practical side. They are also paid by the firm and given school credit for this time spent. In the shops the work is progressive and educational so that the boy gets a thoro insight into the business. There are about four hundred pupils in this work now and it is proving immensely helpful to the pupils as well as the employers who are brought in contact with worthy young people. The pupils are selected from the last three grades of the high school and must be at least 15 years old. In connection with his description of mercantile business he stated that there were 500,000 persons engaged in selling in New York. The field for this kind of educational work is extremely large. To many of those present, Mr. Burnham's talk gave an idea of the trend of much of the vocational school work of the future. The work has been eminently successful so far and is increasing in popularity in the school and especially among businessmen.

R. A. Loomis.

THE METROPOLITAN ARTS ASSOCIATION MEETS.

The Metropolitan Arts Association, whose membership includes all the special teachers in the public schools of eastern Pennsylvania, including the counties of Bucks, Chester, Delaware, Montgomery, and Philadelphia, held its semi-annual Fall meeting November 18, in the high school at West Chester, Pa. President C. E. Karlson, of Elkins Park, presided.

A feature of the program, and a most successful one, was the "questionnaire" conducted by the representatives from the State Department of Public Instruction. Written questions had been sent to the secretary several weeks previous to the meeting and these were classified beforehand and referred to the proper official. Those of particular interest were taken up in the Round Table conferences in the afternoon.

A new department of Elementary Handwork Teachers was organized and will be a permanent feature as will also a department for Continuation School Teachers, subject to action by the Executive Committee.

The meetings were characterized by a helpful, comrade-like spirit that prevailed thruout and the consensus of opinion was that no one can afford to miss them.—*K.*

KANSAS MANUAL ARTS TEACHERS MEET.

The Kansas Manual Arts Association, which held its round table Nov. 10-11 at Topeka in connection with the state teachers' meeting, was attended by a large and enthusiastic body of manual arts teachers.

Mr. H. C. Givens, director of industrial arts at the State Normal School, Pittsburg, Kans., read an address on "Commercial Methods in the School Shop."; Dr. C. A. Prosser, director of the Dunwoody Industrial Institute, Minneapolis, Minn., spoke on "An Experiment in Prevocational Training"; Mr. J. F. Parks, director of industrial arts, Wichita, Kans., argued "The Use of Jigs in the High School Shop"; Mr. W. A. Brandenburg, president of the State Manual Training Normal, Pittsburg, Kans., spoke on "A Long Look Ahead."

Each address was followed by a period of open discussion in which the members participated.

The most important action taken by the Round Table was the appointment of a committee to meet with Dr. Prosser and arrange for action to be taken in regard to the Smith-Hughes Bill. The committee, consisting of Mr. Givens, Mr. Bray, Mr. Davis, Mr. Parks, and Mr. Broucher, gave its report which covered the general features of the bill, the personnel of the board, the duties of such a body, the type of legislation necessary to handle the money secured by the bill.

The committee was made permanent and given power to carry out any plans necessary, looking to the passing of favorable legislation for the state at the next session of the legislature.

A second committee consisting of Mr. Wells, Emporia, Mr. Carl Miller, Salina, and Mr. W. L. Friley, Independence, was appointed to arrange for Kansas exhibits in industrial arts for the Western Drawing and Manual Training Association which meets in May at Lincoln, Neb.

The officers elected were: President, Mr. D. C. Gilbert, Kansas City; vice-president, Mr. H. C. Givens, Pittsburg; secretary, Mr. W. L. Friley, Independence.

W. L. Friley.

VOCATIONAL TEACHERS OF OHIO VALLEY MEET.

One of the practical results of the Ohio Valley Round Table which met in Wheeling, October 27th and 28th, was the passage of a resolution in the Vocational Section providing for the appointment of a committee to perfect a permanent organization of all vocational teachers in the valley. The purpose of the organization is to make a systematic study of the industrial and commercial needs of the Wheeling District, and to secure the aid and co-operation of businessmen and manufacturers in making vocational instruction in schools more closely related to the activities of the community.

The committee is composed of the following: Mr. Merle D. Villee, Triadelphia District High School, chairman; Miss Bertha Gabler, Wheeling High School, secretary; Miss Sedgwick, Bellaire High School; Mr. Singer, Tyler County High School; Mr. Cowles, Martins Ferry High School. The report of the committee was issued in December.

At the sessions, a number of interesting subjects were discussed, among which the following points were prominently set forth:

First. The duty of the school of today is to educate the boy and the girl for the benefit of the community and the state.

Second. The majority of the present-day workers received their early training in European industrial art schools and when the present workers are incapacitated, the industries of this country will become stranded for lack of skilled help. Such help will not be available from Europe.

The solution, according to Mr. C. E. Jackson, who led the discussion, is the immediate establishment of industrial art schools or the introduction of vocational courses in schools as the needs of the individual communities demand.

An effort has been made to incorporate the teaching of pottery in the vocational courses of the Wheeling schools. It is the hope of the city that an industrial art school may in the future be established.

W. G. Carpenter.

VOCATIONAL ASSOCIATION OF THE MIDDLE WEST TO MEET.

The third annual convention of the Vocational Education Association of the Middle West will be held at the Auditorium Hotel, Chicago, on January 18, 19, and 20, 1917. The preliminary program gives promise of a meeting of unusual interest and profit. Previous conventions have proven that this organization aims to provide speakers with expert knowledge of the subjects on which they talk. Purveyors of platitudes rarely appear on the program. Some of the topics are: Vocational Legislation as Exemplified in the National Child Labor Bill, the Smith-Hughes Bill, and the proposed bill for Vocational Education in Illinois; Trade Agreements; Industrial Surveys; Vocational Education as a Fundamental in National Preparedness; The Views of Organized Labor; Work for Women; Agricultural Education; Corporation Schools; The Training of Teachers.

Among the speakers are: Frank M. Leavitt, University of Chicago; Arthur D. Dean, Director of Agricultural and Industrial Education, Albany, N. Y.; C. A. Prosser, Director of Dunwoody Industrial Institute, Minneapolis, Minn.; Frederick W. Roman, Syracuse University, Syracuse, N. Y.; David Snedden, Teachers College, Columbia University, New York; Matthew Woll, Chairman Education Committee of the Illinois Federation of Labor; Supt. John D. Shoop, Chicago; Florence M. Marshall, Principal Manhattan Trade School for Girls, New York; Matthew P. Adams, Superintendent of Mooseheart Industrial Institute, Mooseheart, Ill.; L. D. Harvey, Director of Stout Institute, Menomonie, Wis.; Charles H. Winslow, Director of Indiana Vocational Survey; F. D. Crawshaw, Director of Manual Training, University of Wisconsin; Louis F. Post, Assistant Secretary, Department of Labor; David S. Shanahan, former speaker, House of Representatives; Royal Meeker, Statistician of the Department of Labor, Washington, D. C.; W. C. Bagley, Dean School of Education, University of Illinois.

Copies of the final program may be obtained by writing to Mr. A. G. Bauersfeld, Secretary, 1225 Sedgwick St., Chicago.

CO-OPERATION OF ART ORGANIZATIONS IN DEVELOPING INDUSTRIAL-ART EDUCATION.

At a recent meeting of the Municipal Art Society of New York, held at the National Arts Club, the subject for discussion was "The Artistic Responsibility of the Art Societies to the City Before and After the War." Mr. F. W. Ruckstuhl spoke particularly on behalf of the Society, while Dr. James P. Haney urged co-operation.

Dr. Haney, speaking of co-operation along industrial art lines, said: "This country needs a campaign for preparedness in industrial art. We have abundance of talent in the country but no sane method of sifting it out. We talk much about vocational guidance, but not a dozen schools thruout the land are organized so as to catch young people of artistic ability and properly train them to enter advanced industrial art courses.

"We do not even know how far we are behind and so have taken practically no steps to unite our forces, which might lead to industrial art supremacy. Before the war these lessons were apparent, and as the war has progressed our failure to recognize our industrial art opportunities has become more and more clear. Our art societies should unite to advance the industrial arts. Most of our artists in the trades are mere copyists, sponging on the work of men in Paris and other Continental cities. There is no need of this. We have the skill, but we do not know how to use it. Twenty-five years ago there was virtually no market for American landscapes. A canvas had to bear the mark of Paris or Munich upon it to be acceptable. Thanks to intelligent action on the part of a few scores of people, the American landscape painter has reaped the reward of this recognition.

"Exactly this same thing is possible along the lines of industrial design. What we need is co-operation between art societies and manufacturers. We need an industrial art committee of the Board of Trade; an industrial art committee of the Fine Art Federation. We need scholarships for talented pupils; we need industrial art courses in a dozen different high schools in which these pupils can early be trained. We need an industrial art school of our own with a dozen to a score of different courses, forwarding the student directly into the industrial art trades.

"All this costs money, but more than this, it costs interest and effort. The money it costs is not a tithe of what the city loses yearly thru its inability to mobilize its own industrial art forces. Millions in money have been sent abroad to pay for goods enriched by foreign artists. If we are wise we shall seek, thru every art society and thru every trade society, to develop an industrial art of our own and to reap for ourselves the huge profit which such a development will bring."

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects.

A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be mailed flat and should be addressed:

The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

AN ADAM WRITING TABLE.

George K. Wells, Emporia, Kans.

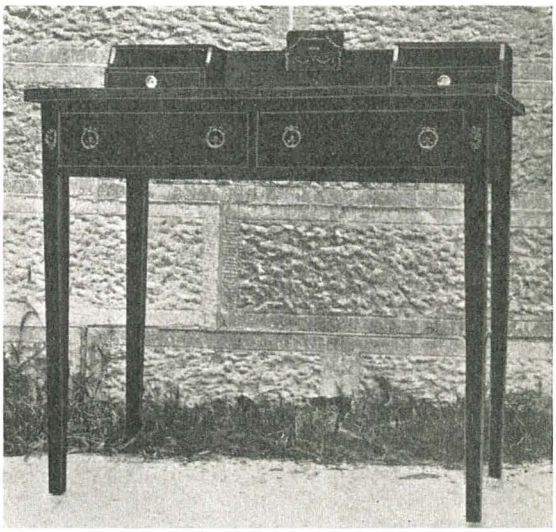
In this day of period style, if we would keep up with the times, we must make other than crafts furniture.

The drawing and picture show the simplest variation, which is the Adam period.

The table was made of walnut but would look well in mahogany. The two complete frames, one above and one below the drawers, help to make a substantial table.

Ends and frames should be assembled separately and then put together. The small drawers and back board are fastened with screws from under the top and then the top fastened down.

The period ornaments may be purchased for a few cents, and the period hardware is inexpensive.

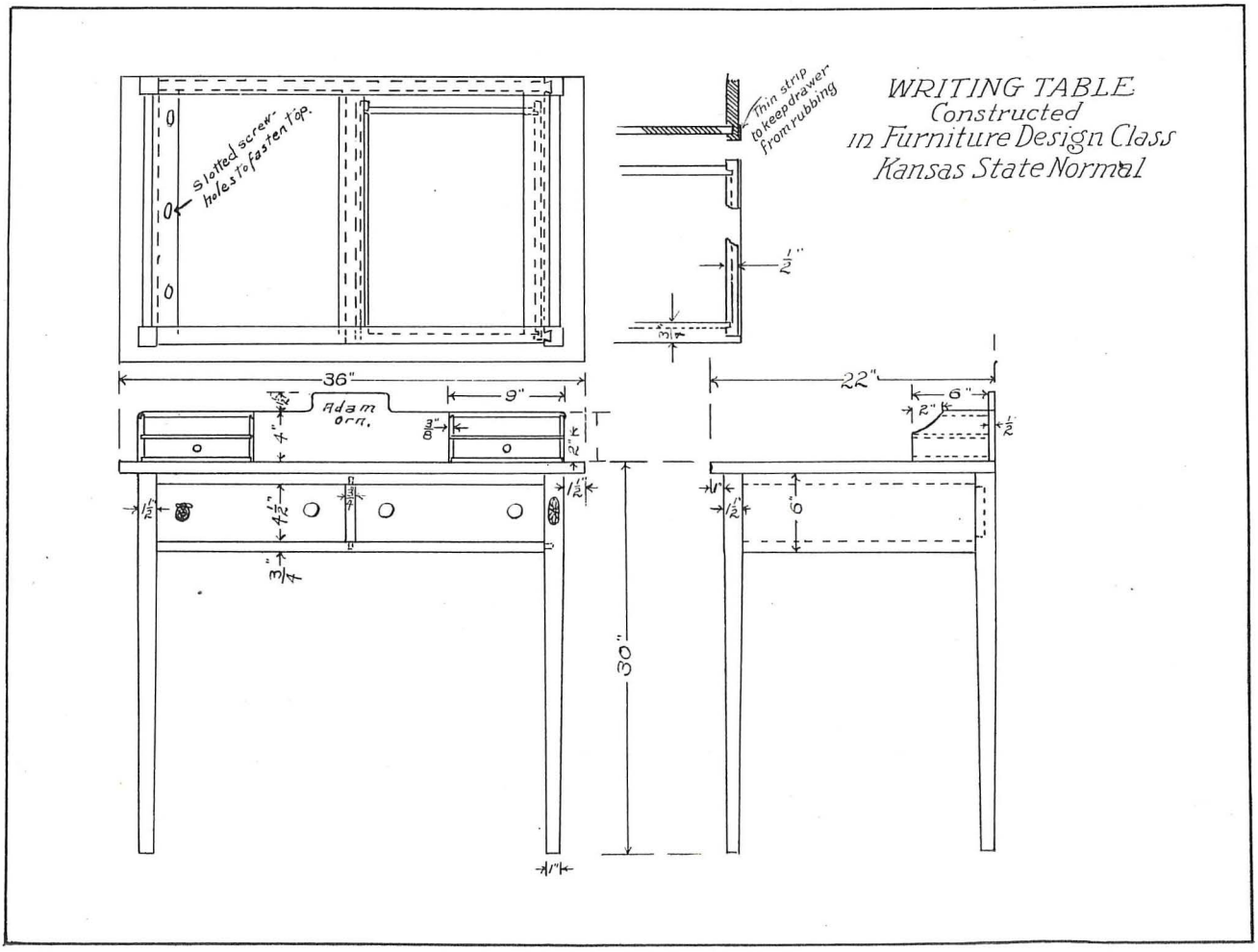


Desk with Adam Ornament.

FORGING A WHIFFLETREE HOOK.

Thomas F. Googerty, Pontiac, Ill.

The making of a whiffletree hook is a very simple exercise provided one has some knowledge of welding. One can do very little in the forge shop if he is unable to heat his metal properly. Practice in raising the welding heat is very important in forging, therefore, pupils should be given exercises which involve welding. In Fig. 1 is shown a whiffletree hook in place at the end of a singletree. Hooks of this



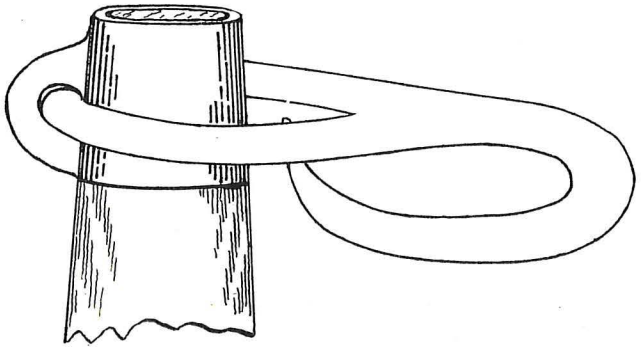


Fig. 1. Whiffletree Ferrule and Hook.

kind are generally used with lumber or farm wagons; they are made from $\frac{3}{8}$" or 7/16" round stock. The ferrule is malleable iron and can be purchased from a hardware dealer. They vary in size but one with about $1\frac{3}{8}$" hole is suitable.

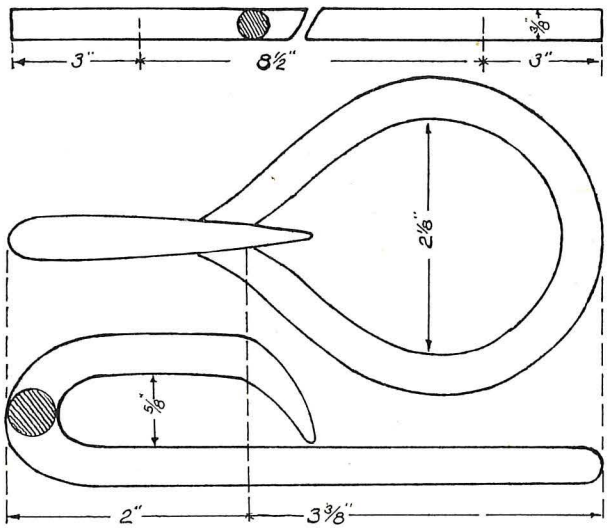


Fig. 2.

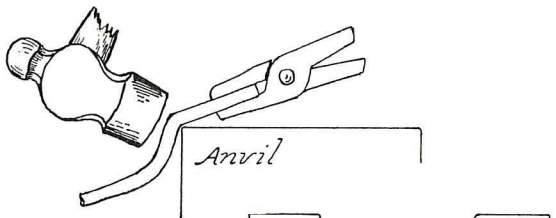


Fig. 3.

Fig. 4.

In making the hook for practice it can be made without using the ferrule. In doing this the stock used can be iron or soft steel, perhaps iron is best for a beginner. At Fig. 2 is represented the drawing for the hook, also the length to cut the stock which is $14\frac{1}{2}$ inches.

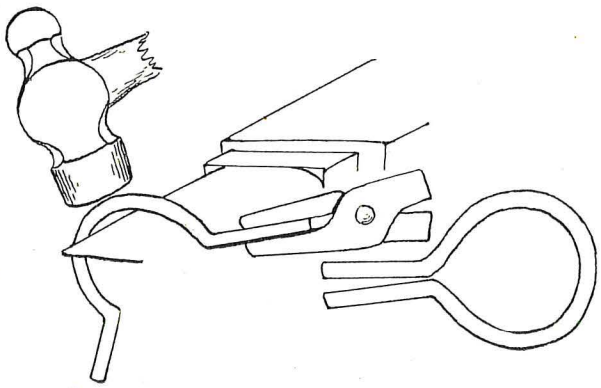


Fig. 5.

The bar is center-punched three inches from each end; the stock in the center between these marks is to be used for the eye. The bar is now heated in the center and hammered at the center-punch mark to bend it on an angle as shown in Fig. 3. The other end is bent in the same manner and the piece should look somewhat like drawing Fig. 4. It is now heated in the center and formed into an eye by hammering

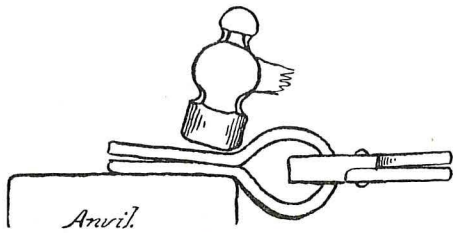


Fig. 6.

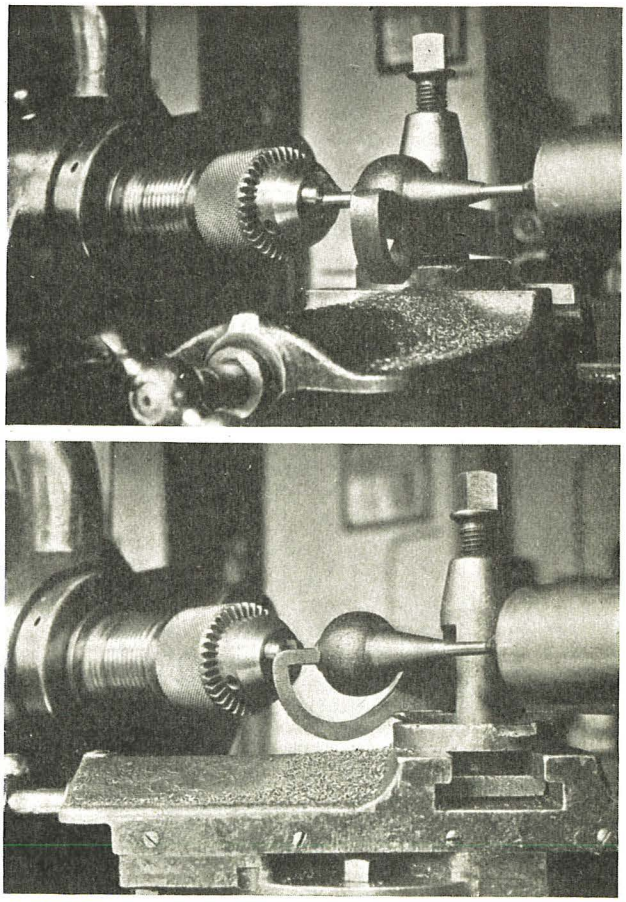
it over the horn of anvil. See Fig. 5. The eye is now caught with the tongs and a welding heat taken on the other end to weld and draw out the hook part. In welding the first blow is struck close to the eye in order to weld that part first, then the ballaner. See Fig. 6. The hook is then formed into shape by hammering it over the horn of anvil. When shaped it is allowed to cool and some oil rubbed on to finish it and keep it from rusting.

A MACHINE-SHOP "KINK."

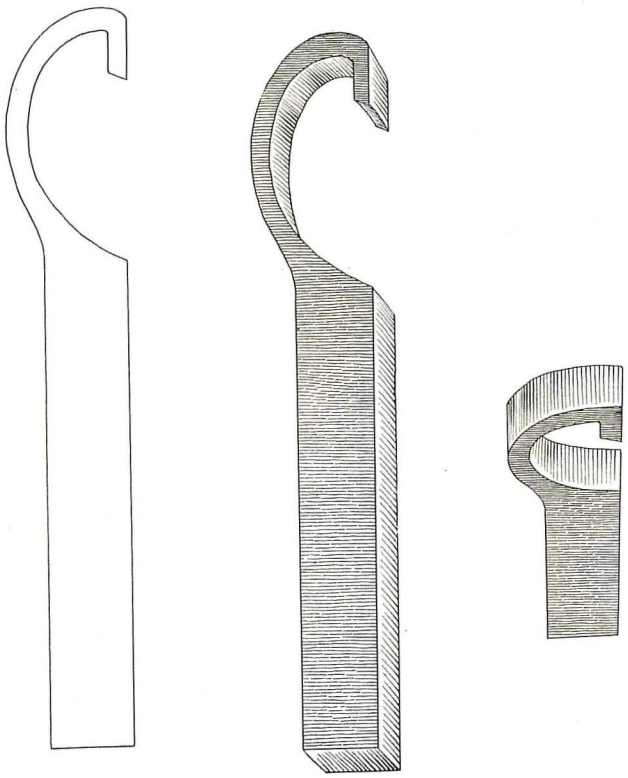
Joseph J. Eaton, Director of Industrial Arts,
Yonkers, N. Y.

To beginners, and to many journeymen machinists for that matter, it is always a difficult job to turn a spherical surface. One may "nibble" at the stock with various lathe tools and then finish the work with hand tools. Whatever method of this sort is employed, the desired sphere is only approximate in shape and usually not even a close approximation.

All of these difficulties may be overcome in a simple way.



Tools for Spherical Surfaces in Use.



The Tool.

For this purpose there is presented herewith a device which may be used by the novice with absolutely accurate results. Simpson McPhail, instructor in charge of the machine-shop in the Saunders Trades School, is the inventor of this process and, insofar as we know, it has never before been published.

A lathe tool of special design and a lathe having a compound rest fulfill the requirements. The stock to be turned is placed between the centers in the usual way (here shown with a chuck in place of a live center and lathe dog). The tool post is run in back of the stock in order that the radius center may be brought directly under the work. The size of the sphere to be turned regulates the position of the tool post.

The lathe turns forward in the usual manner and the whole job is directly in sight all the time. After the carriage, with tool post and special tool, has been properly located by test, the lathe is started as usual and the work is machined by rotating the tool by the aid of the compound rest. The speed of the lathe is slightly less than in straight turning and the bolts of the compound rest must be loosened to allow the rest to swing.

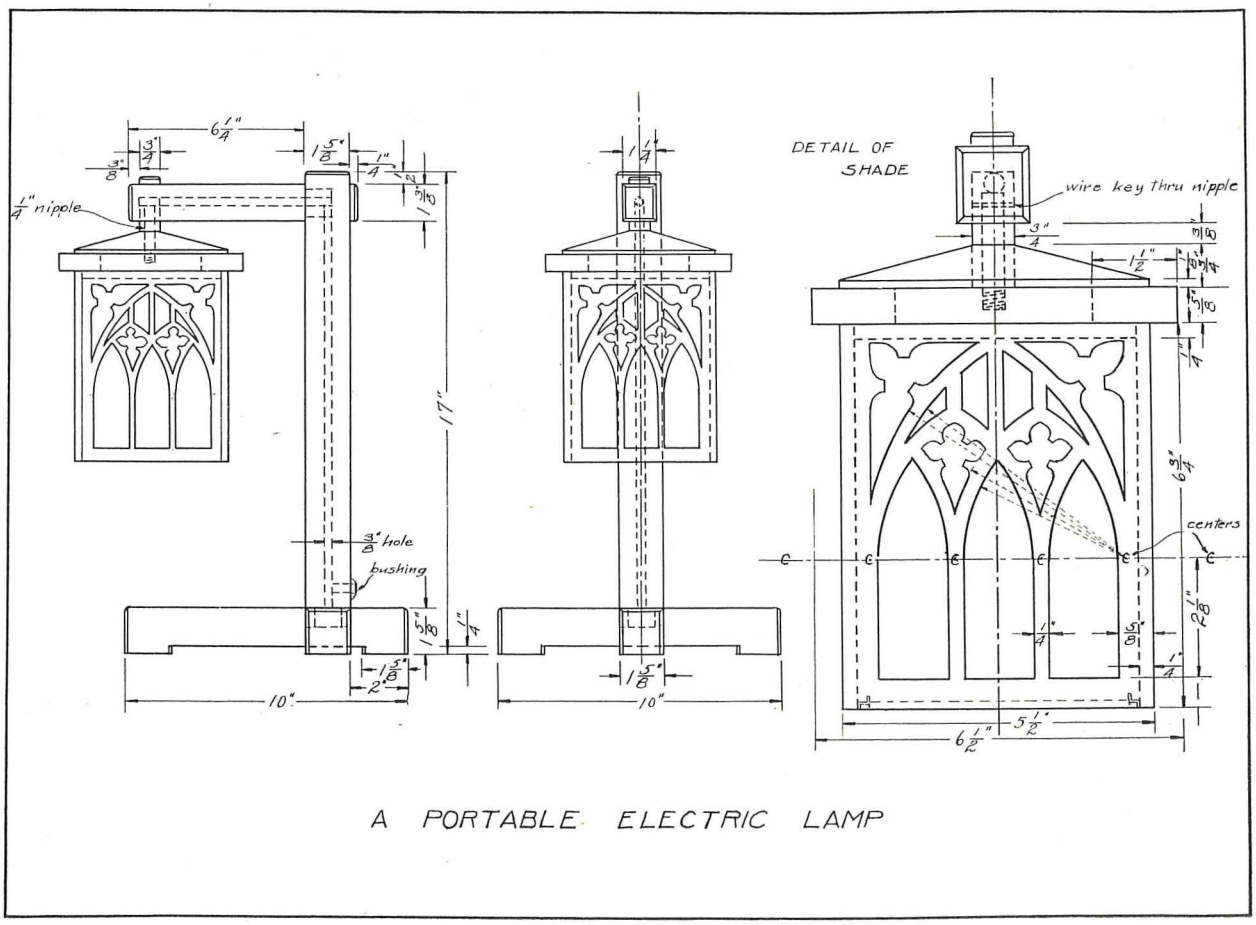
Additional chips are taken by drawing in the tool in the usual manner and by repeating the swinging motion of the rest. These operations are continued until the stock is turned down to the required diameter.

In the attached drawing of the lathe tool only proportionate sizes are shown. The tool is made from ordinary carbon steel, $\frac{5}{8}''$x$1\frac{1}{8}''$. The body is about 5″ long and the curved arm is made of such size as the diameter of the desired sphere will require. The cutting arm ends in a cutting nose ground with a concave edge. This edge is about $\frac{5}{8}''$ on the arc. A round nose will not chatter so much and might be preferred by some workers.

The cutting edge has an ordinary lathe tool temper, a dark straw color, and the arm a spring temper.

It is a wise precaution to set the cutting edge just below the level of the lathe centers and to adjust the lathe for a comparatively slow speed.

To repeat, for emphasis, in taking additional cuts the tool is fed towards the work in the usual manner. The only skill required, after setting up the job, is to secure proper speed, avoid taking too large a chip, and to use care in swinging the tool. After a little practice each pupil can set up a job himself.



A PORTABLE ELECTRIC LAMP

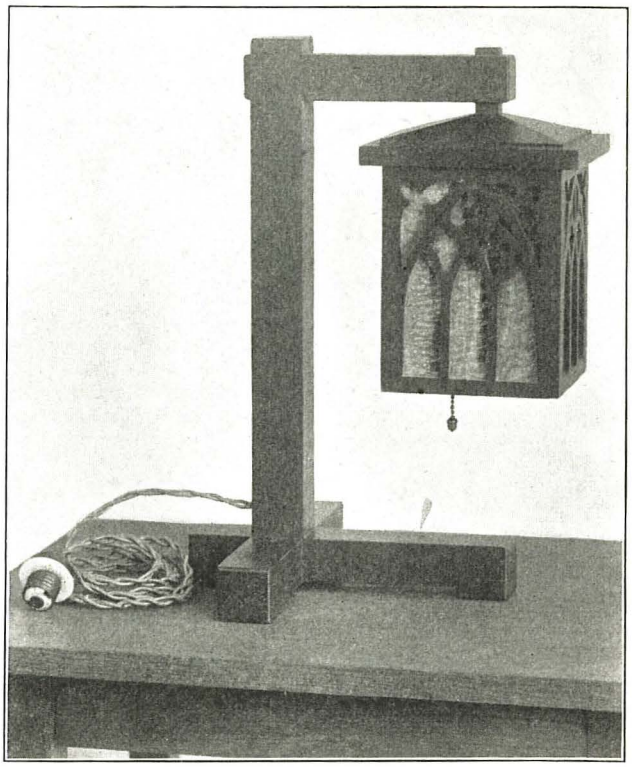
A PORTABLE ELECTRIC LAMP.

H. E. Boggy, Scottland High School, Scottland, Ill.

The project is designed along Gothic lines and makes an excellent lamp.

Any hard wood may be used. The photograph shows the lamp made of walnut with a streaked orange art-glass in the shade. The ends of the frame are rounded back $\frac{1}{8}''$ with the sandpaper block. It will be seen that the mortise and tenons are carried only a part of the way thru the respective pieces and a cap glued to the back (for appearance only). The holes for the lamp cord are bored before the stock is assembled. It is advisable, too, to pull the cord thru the holes as the pieces are glued together in order.

The shade is, perhaps, the most difficult part to construct. The top is made of two pieces, the beveled part and the over-hang. By using the points marked "c" as centers for the radii as given in the detail drawing, one will not find the sides difficult to copy. After one drawing is made, it is best to trace enough for each side and paste with a common flour-water paste. When sawing is finished, all traces of paste and paper may be removed with sandpaper. The sides should be nailed, the heads of the brads sunk and filled with a putty made of glue and fine sawdust. The art-glass is supported by a small strip around the inside of the shade. A copper hook holds each piece of glass in place. Silk cord and a pull-chain socket are best suited for the lamp.



Portable Electric Lamp.

NEW BOOKS.

Report of School Survey of Denver on Vocational Education.

By C. A. Prosser and W. H. Henderson. 90 pages. 25 cents. School Survey Committee, Denver, Colorado.

This report contains a discussion of the need for vocational education in Denver, and the extent to which this need is being met by existing agencies, and recommends a program for more fully meeting the needs. Insofar as the conditions in Denver are similar to those in other cities, the report applies to all cities in the country.

To school authorities in a city approximating 200,000 in population striving to provide vocational education, the report offers a suggestive and constructive program. To supervisors of commercial, industrial, and art work in public schools the report suggests a comparatively simple but effective method of surveying their own work.

The report on child labor and compulsory school attendance suggests one of the most constructive and advanced programs yet proposed.

Practical Perspective.

Fourth Edition. By Frank Richards and Fred H. Colvin. 58 pages. Illustrated. Price, 50 cents. The Norman W. Henley Publishing Company, New York.

A brief text explaining the use of isometric sketching paper for the production of isometric drawings of machine parts and mechanical representation in general.

Plain and Ornamental Forging.

By Ernest Schwarzkopf. Cloth, 277 pages. Price, $1.50 net. John Wiley & Sons, New York.

This splendid textbook has been developed as the result of many years of experience as a practical smith and general metal-worker as well as a teacher. The treatment, which begins with a description of the properties of iron, of the forge and forging tools, is rather simple and formal. A large number of exercises is presented in upsetting, shouldering, bending, etc., before welding is taken up and welding exercises are suggested. The chapter on toolmaking is particularly complete and usable. The final section of the book is devoted to art forging and is exceedingly full and technical in the amount and variety of methods and objects presented. The author shows his strong predilection for the German school of art smithing and presents photographs of flowers, leaves and other natural objects that are marvelous in their simulation of nature. In fact, one is inclined to question whether craftsmanship has not gone too far and whether the character of the medium—iron—is not lost.

The book is well arranged and carefully illustrated.

Constructive Sewing.

Book One. By Mary E. Fuller. Paper, 91 pages. Industrial Book & Equipment Co., Indianapolis, Ind.

Here are studies in stitches, studies upon textiles, studies in drafting patterns. Better even than the lessons in sewing are the lessons in construction. It is a good deal to learn how to draft a pattern from definite instructions; it is more to learn how to modify the original pattern to meet other uses. This work stimulates initiative and broadens the womanly art of sewing.

Dressmaking as a Trade for Women in Massachusetts. Bulletin No. 193, United States Department of Labor. By May Allinson. Published by the government printing office, Washington, D. C. The pamphlet traces the development of the trade in the United States from the family dressmaker to the specialized workers in shops. It discusses the industrial conditions in the trade, irregularity of employment, overtime, wages and earnings in Boston, the teaching of the trade and the future outlook. There is a bibliography on women in the clothing trades.

A valuable bibliography of child labor has just been published as a bulletin by the Children's Bureau of the United States Department of Labor. All the speeches on child labor in Congress up to June 30, 1916, are listed in the bibliography. Special sections are devoted to health, vocational training, vocational guidance, mothers' pensions, minimum wage and compulsory education. A copy of the list may be obtained by addressing the chief of the Children's Bureau, Washington, D. C.

Judging the Dairy Cow as a Subject of Instruction in Secondary Schools. By H. P. Barrows and H. P. Davis. Bulletin No. 434, United States Department of Agriculture. The scoring and judging of the dairy cow has become popular in the teaching of agriculture in secondary schools. It has done much to arouse interest in animal husbandry and dairying. The pamphlet supplies a distinct need for aid in making the work practical and gives specific directions for scoring and judging different types of cows. The pamphlet takes up the use of illustrative material, the classification of points in reference to utility, and practice judging by the students.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Sheetmetal Work.

521. Q.—I am giving an elementary course in sheetmetal construction. Can you refer me to any publications which will be helpful to me?—*R. F. G.*

A.—Suggestions for an elementary course in sheetmetal work were published recently in the *Industrial-Arts Magazine* under the heading "Sheetmetal as a Manual Training Subject." In this article a list of publications were given that could be made by the student for home and school use, giving practice in the handling of tools and the operation and uses of the various machines in the construction of work. In addition to the shopwork, a course in elementary geometrical drawing and sheetmetal pattern drafting should be given. David Williams Company, New York, publish a book entitled, "Practical Sheetmetal Work and Demonstrated Patterns, Volume IX, Tin Shop and Furnace Book. Price, $1.50. This book contains many practical problems, also showing the construction and development of patterns for same, and could be used to good advantage in a course of this kind.—*J. S. Daugherty.*

Refinishing Walnut Furniture.

524. Q.—Would you please tell me the best way to refinish old walnut furniture?—*J. E. C.*

A.—The probabilities are that the old walnut furniture to which the questioner has referred belongs to a period in which fine veneers, from the somewhat rare walnut crotch, were used to face the panels in the cabinets, etc. The first thing for him to do is to remove the old varnish by the use of some form of varnish remover. If this cannot be obtained in the paint shops, a very powerful material may be made as follows:

In a clean varnish can, pour one quart of denatured alcohol, one quart of benzole (solvent naptha) and one-quarter pound of grated paraffine. Cork the can lightly, immerse in boiling water until the paraffine is thoroly melted, withdraw the can from the hot water and hold under running water, shaking the can until the mixture produces a thick emulsion. With a hair or flitch brush, slop on the varnish remover, covering a space of about two square feet before stopping. Let this material remain for ten or fifteen minutes or until the varnish has begun to blister or wrinkle, then with a wide putty knife remove the old varnish in long ribbons. Continue the process until the varnish is removed to the wood, after which remove all greasiness by using denatured alcohol and pieces of burlap to scrub the work. It is best to take the pieces of furniture apart as far as practicable before proceeding with the varnish removing and cabinet work. Do not reassemble the pieces until the varnishing and polishing are complete. Thoroly sand the work with No. ½ and 0 sandpaper until smooth. Stain with following solution:

Into one gallon of hot water, dissolve one ounce each of potassium permanganate and one ounce of epsom salts. Let the stain dry over night. In case this water stain cannot be made, the following formula will produce a very fine oil stain:

Cut asphaltum varnish with turpentine and benzol, equal parts, then add a solution of oil black (one part to ten of turpentine) until the depth of shade required is obtained.

Care should be exercised in the case of any veneering to avoid getting *too much* stain on the veneer so as to cause it to blister. As soon as the color takes, wipe off the excess. Let the furniture dry over night, shellac with a very thin coat of orange shellac reduced one-half with alcohol. Sand with 00 sandpaper and dust carefully. Varnish with three or more coats of Pratt & Lambert's No. 61, allowing three days or more between coats, rubbing the last two with pumice stone and water. Polish in oil.—*Ralph G. Waring.*

Stain for Soft Woods.

529. Q.—Can you give me the name of a good brown stain for poplar, pine and other soft woods, also name of dealer?—*L. W.*

A.—In answer to the above question for a good brown stain on soft woods as cypress, pine, poplar, etc., use one gallon of gasoline, one pint of raw linseed oil, half pint of Japan drier and add enough asphaltum varnish to produce the depth of tone needed when tried on a sample of wood. When the stain is dry give one coat of orange shellac followed by two or more coats of a good varnish, rubbed dull when dry, allowing three days or more between coats.—*Ralph G. Waring.*

Sheetmetal Work.

562. Q.—Will you please let me know of any book or place, or if you have any material I could get in which there are suggestions for a course in mechanical drawing for the first and second-year high school in sheetmetal work? —*H. A. H.*

A.—There are no books in existence which treat of sheetmetal drawing or pattern drafting, and which are so arranged as to be used as a textbook for student purposes. The following book would be helpful in planning a course in drawing: *The New Metal Worker Pattern Book,* published by David Williams Co., New York. This book is a treatise on pattern drafting as applied to all branches of sheetmetal work in which every imaginable form of pattern is clearly and practically demonstrated.—*J. S. Daugherty.*

Drafting Conventions.

572. Q.—Can you give me advice on the question of conventions and letters for the most practical instruction in our public school drafting departments? One of the mooted questions is the use of all caps or small letters of the Americanized italic lower case type, some arguing that the small letter is more rapid and easier to form, while others argue that all caps are used more commonly in mechanical drawing, and as a base for the architectural and furniture lettering.

A.—Instruction in schools for engineering and architectural draftsmen consists of drawing of both upper and lower case letters and numerals of the simplest form. It is drill upon the form of the letters and the adjustment of letters in conjunction.

The Americanized italic lower case letters are used quite universally for engineering and architectural details. The upper case type is used for titles and quite largely for architectural drawing. It would seem, however, that neither one nor the other could be used exclusively to advantage and that both should be taught.

The best instruction gives considerable drill upon the general body and form of the letters and omits all serifs, accents and ornamentation, unless there is time for a study of these in addition to the essential practice in rapid freehand printing.

A recent book on Mechanical Drawing for Secondary Schools, by Professor Crawshaw and Professor Phillips, of the University of Wisconsin, published by Scott, Foresman & Co., gives, together with problems in mechanical drawing, a series of lettering plates which represent excellent instruction in lettering. These plates emphasize the kind of stroke necessary to the formation of letters of both upper and lower case. They also emphasize the methods of relating the letters one to the other in the form of words and statements. They also give definite instruction upon the conventions of mechanical drawing which are in common practice.